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Revision 2
July 2002

U.S. Department of Energy
Idaho Operations Office

Monitoring System and Installation Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer

INEEL
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Idaho National Engineering and Environmental Laboratory

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Prepared for the
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ABSTRACT

This Monitoring System and Installation Plan provides the general strategy for accomplishing the Operable Unit 3-13, Group 5, Snake River Plain Aquifer remedial action. This work plan presents the design basis and data quality objectives that were developed based upon an evaluation of remedial action requirements set forth in the Operable Unit 3-13 Record of Decision. Summaries of the primary remedial action design elements are discussed, including the Plume Evaluation Field Sampling Plan and the Long-Term Monitoring Plan. The Field Sampling Plan was developed to determine if contingent pump and treat remediation of the Snake River Plain Aquifer is necessary. The Long-Term Monitoring Plan was developed for long-term monitoring of the Idaho Nuclear Technology and Engineering Center groundwater plume outside of the Idaho Nuclear Technology and Engineering Center fence and to monitor the flux of contamination in the Snake River Plain Aquifer migrating from beneath Idaho Nuclear Technology and Engineering Center. This work plan also references or presents the supporting documentation required for performing the remedial action, including the project health and safety plan, waste management plan, project schedule and cost estimate, data management plan, quality assurance project plan, and various other documents required for implementation of the Group 5 remedial action.

CONTENTS

FIGURES

TABLES

ACRONYMS

AA	alternative action
AIR	allowable incremental risk
ARAR	applicable or relevant and appropriate requirement
ART	allowable risk threshold
BBWI	Bechtel BWXT Idaho, LLC
BLM	Bureau of Land Management (Department of Interior)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIR	CERCLA Incremental Risk
COC	contaminant of concern
CPP	Chemical Processing Plant
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DQO	data quality objective
DR	decision rule
DS	decision statement
EPA	Environmental Protection Agency
ER	environmental restoration
FFA/CO	Federal Facility Agreement and Consent Order
FS	feasibility study
FSP	Field Sampling Plan
FSS	feasibility study supplement
GSA	General Services Administration
HASP	Health and Safety Plan
HLW	high-level waste

HLWIR	High Level Waste Incremental Risk
ICDF	INEEL CERCLA Disposal Facility
ICPP	Idaho Chemical Processing Plant
IDHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LTMP	long-term monitoring plan
MCL	maximum contaminant level
MCP	management control procedure
MSIP	Monitoring System and Installation Plan
NPDES	National Pollutant Discharge Elimination System
NRF	Naval Reactor Facility
NSIR	New Site Incremental Risk
OU	operable unit
PSQ	principal study question
QAPjP	Quality Assurance Project Plan
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RFP	Request for Proposal
RG	remediation goal
RI/BRA	remedial investigation/baseline risk assessment
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
ShoBan	Shoshone Bannock (Tribal Council)
SMO	Sample Management Office

SOW	Scope of Work
SRPA	Snake River Plain Aquifer
TRL	total risk level
WAG	waste area group

Monitoring System and Installation Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer

1. INTRODUCTION

In accordance with the Idaho National Engineering and Environmental Laboratory (INEEL) Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991), the Department of Energy (DOE) submits the following Monitoring System and Installation Plan (MSIP) for the remediation of the Idaho Nuclear Technology and Engineering Center (INTEC), Waste Area Group (WAG) 3, Operable Unit (OU) 3-13, Group 5, Snake River Plain Aquifer (SRPA). The Remedial Design/Remedial Action (RD/RA) Scope of Work (SOW) (DOE-ID 2000a) for Group 5, is in accordance with the signed OU 3-13 Record of Decision (ROD) (DOE-ID 1999) and describes the RD/RA process, and identifies the tasks for the Group 5 remedy under the ROD.

The RD consists of a series of engineering documents that detail the steps to be taken during the RA in order to meet the remedial action objectives established in the ROD; its goal is the successful planning of the RA phase of the project. The RA phase includes the elements, systems, and actions necessary for successful implementation of the remedy.

1.1 Background

The INTEC, formerly known as the Idaho Chemical Processing Plant (ICPP), is located in the south-central area of the INEEL in southeastern Idaho (Figure 1-1). From 1952 until 1992, operations at the INTEC primarily involved reprocessing spent nuclear fuel from defense projects. This entailed extracting reusable uranium from spent fuel. Liquid waste generated from the reprocessing activities that ceased in 1992 is stored in an underground tank farm at the INTEC. This waste was previously treated using a calcining process at the facility. Both soil and groundwater contamination has resulted from these operations. Under the FFA/CO, the U.S. Environmental Protection Agency (EPA), the Idaho Department of Health and Welfare (IDHW), and the DOE (also referred to as the Agencies) are directing cleanup activities to reduce human health and environmental risks to acceptable levels. Per the FFA/CO, the INTEC was designated as WAG 3. In order to facilitate remediation of the INTEC, WAG 3 was further divided into OUs comprised of individual contaminant release sites.

Several phases of investigation have been performed at the OUs within WAG 3. A comprehensive remedial investigation/baseline risk assessment (RI/BRA) (DOE-ID 1997a) was conducted for OU 3-13 to determine the nature and extent of contamination and corresponding potential risk to human health and the environment under various exposure pathways and scenarios. Based on the remedial investigation/feasibility study (RI/FS) results, INTEC release sites were further segregated into seven groups based on contaminants of concern (COCs), accessibility, or geographic proximity to allow analysis of remedial action alternatives in the WAG 3 Feasibility Study (FS) (DOE-ID 1997b and 1998). The contaminated portion of the SRPA outside the INTEC security fence where COC concentrations in groundwater exceed drinking water standards was designated as Group 5 in the OU 3-13 ROD.

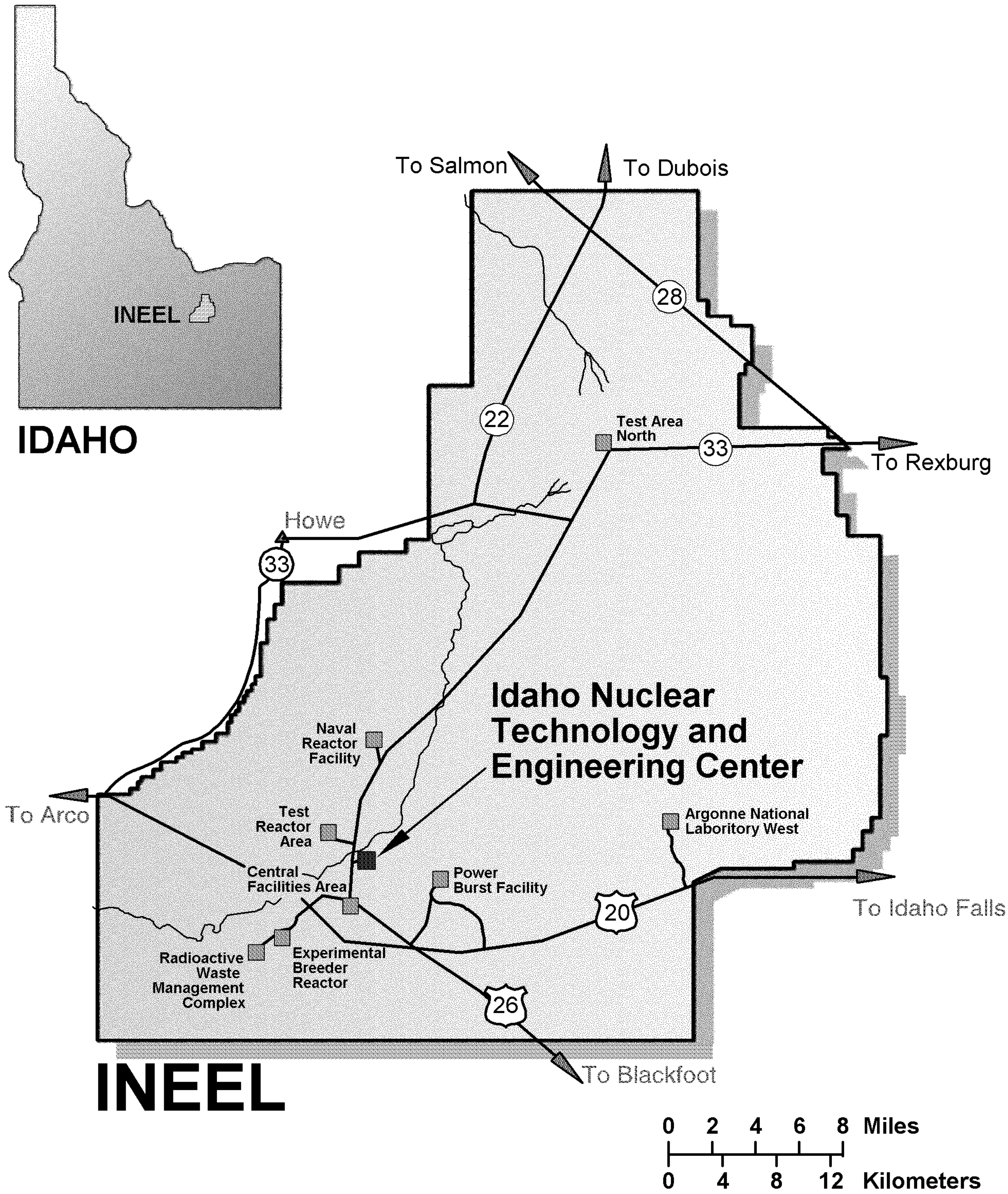

Figure 1-1. Map showing location of the INTEC at INEEL.

The major human health threat posed by contaminated SRPA groundwater is exposure to radionuclides via ingestion by future groundwater users. Based on the groundwater simulations presented in the FS (DOE-ID 1997b) and FS Supplement (FSS) (DOE-ID 1998), removal of the existing percolation ponds from service will significantly reduce the concentrations of contaminants in SRPA groundwater by 2095. Additional RA may be necessary to meet the groundwater maximum contaminant levels (MCLs) for beta particle and photon-emitting radionuclides. RA for the SRPA is bounded by the contaminant plume that exceeds Idaho groundwater quality standards or the federal MCLs for tritium (H-3), strontium-90 (Sr-90), and iodine-129 (I-129). Maps of the H-3, Sr-90, and I-129 plumes are presented in Figures 1-2 through 1-4, respectively.

1.2 Selected Remedy

An interim action is selected for the SRPA as described in the OU 3-13 ROD. While the remediation of contaminated SRPA groundwater outside the INTEC security fence is final, the final remedy for the contaminated portion of the SRPA inside the INTEC security fence is deferred to the tank farm RI/FS investigation, which has been designated as OU 3-14. Because the SRPA groundwater contaminant plume associated with INTEC operations is divided into two zones, the remedial action described herein is classified as an interim action. The selected interim action remedy for the SRPA is Institutional Controls with Monitoring and Contingent Remediation. The SRPA interim action remedy includes the following:

1. Implement institutional controls over the area of the aquifer that exceeds the MCLs for H-3, Sr-90, and I-129 (to include a DOE-ID directive limiting access) to prevent groundwater use while INTEC operations continue and to restrict future groundwater use (through noticing this restriction to local county governments, Shoshone Bannock [ShoBan] Tribal Council, General Services Administration [GSA], Bureau of Land Management [BLM], etc.), including site access restrictions, drilling restrictions, and maintenance during DOE operations at INTEC.

   Implementation: This remedy is being implemented through institutional controls identified and described in the OU 3-13 RD/RA SOW.

2. Implement institutional controls, including land use restrictions to prevent the use of SRPA groundwater over the area of the aquifer that exceeds the MCLs for H-3, Sr-90, and I-129, until drinking water standards are met, which is projected to occur by 2095.

   Implementation: This remedy is being implemented through institutional controls identified and described in the OU 3-13 RD/RA SOW.

3. Establish SRPA monitoring wells outside of the current INTEC security fence to assess whether MCLs will be exceeded after 2095.

   Implementation: This remedy is being implemented through this MSIP and associated work plans. This MSIP details the deepening of four existing SRPA monitoring wells and installation of one new well to sample both the sediments and groundwater of the SRPA above, below, and within the HI (HI is nomenclature for the interbed between the H and I basalt beds as discussed in Anderson and Lewis [1991]) sedimentary interbed in the vicinity of the WAG 3 RI/FS numerical-model-predicted hot spot (that is, the location of highest COC concentrations). It also details groundwater monitoring of existing wells to support the assessment of whether MCLs will be exceeded after 2095. Data collected through these activities will be analyzed to predict whether MCLs will be exceeded after 2095.

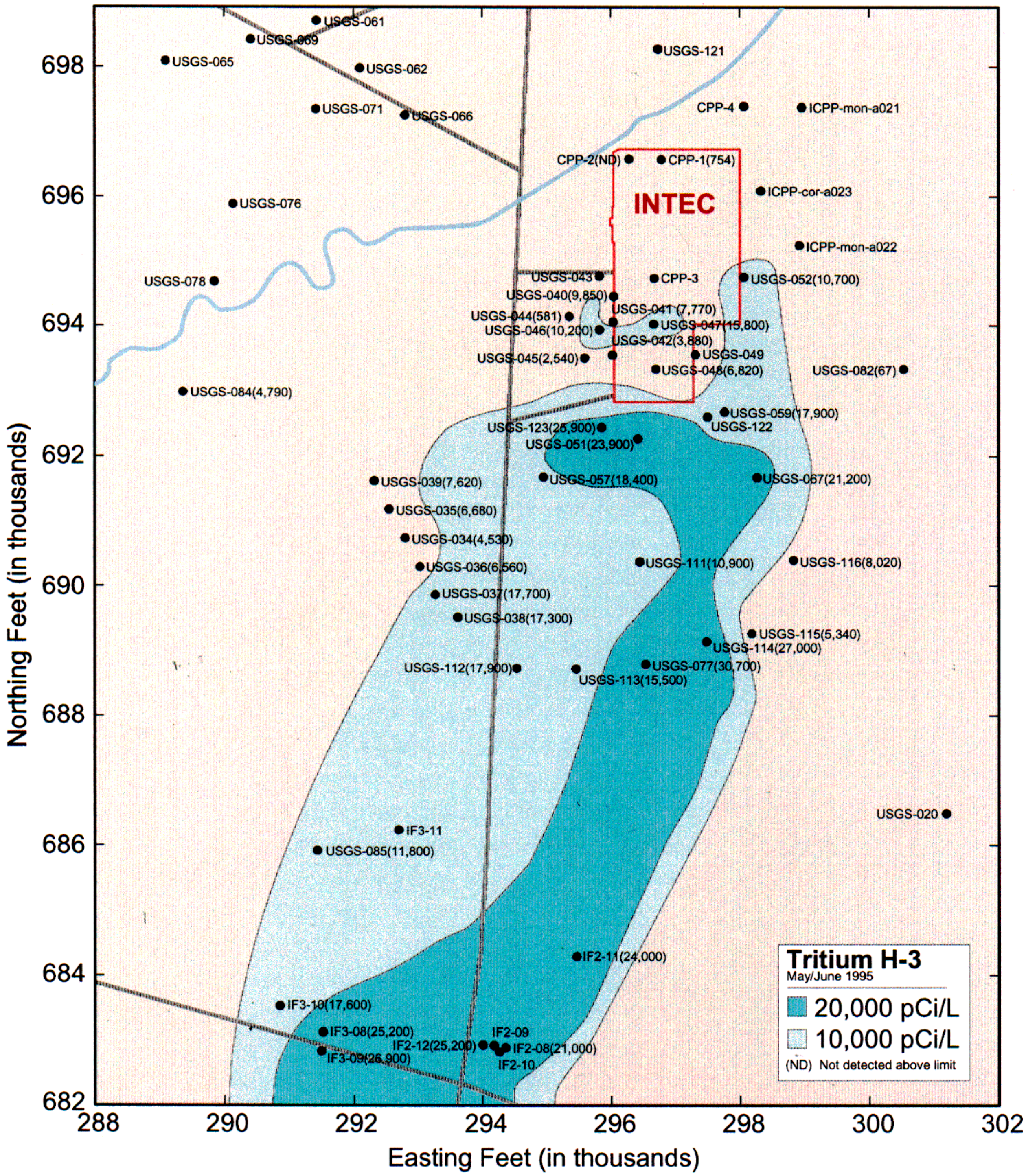

Figure 1-2. Contaminant plume showing where tritium (H-3) has been found to exceed standards (May/June 1995).

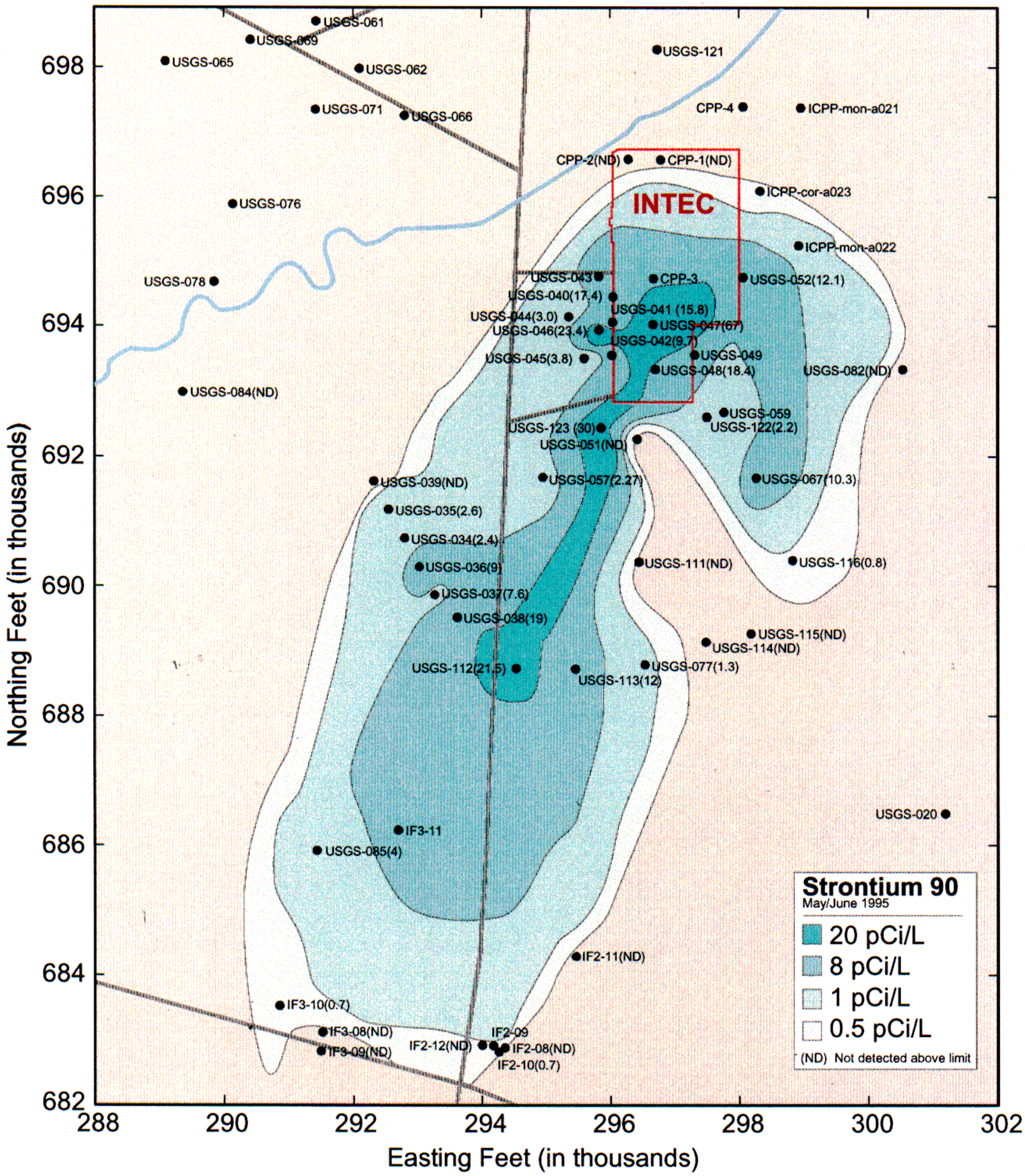

Figure 1-3. Contaminant plume showing where strontium-90 (Sr-90) has been found to exceed standards (May/June 1995).

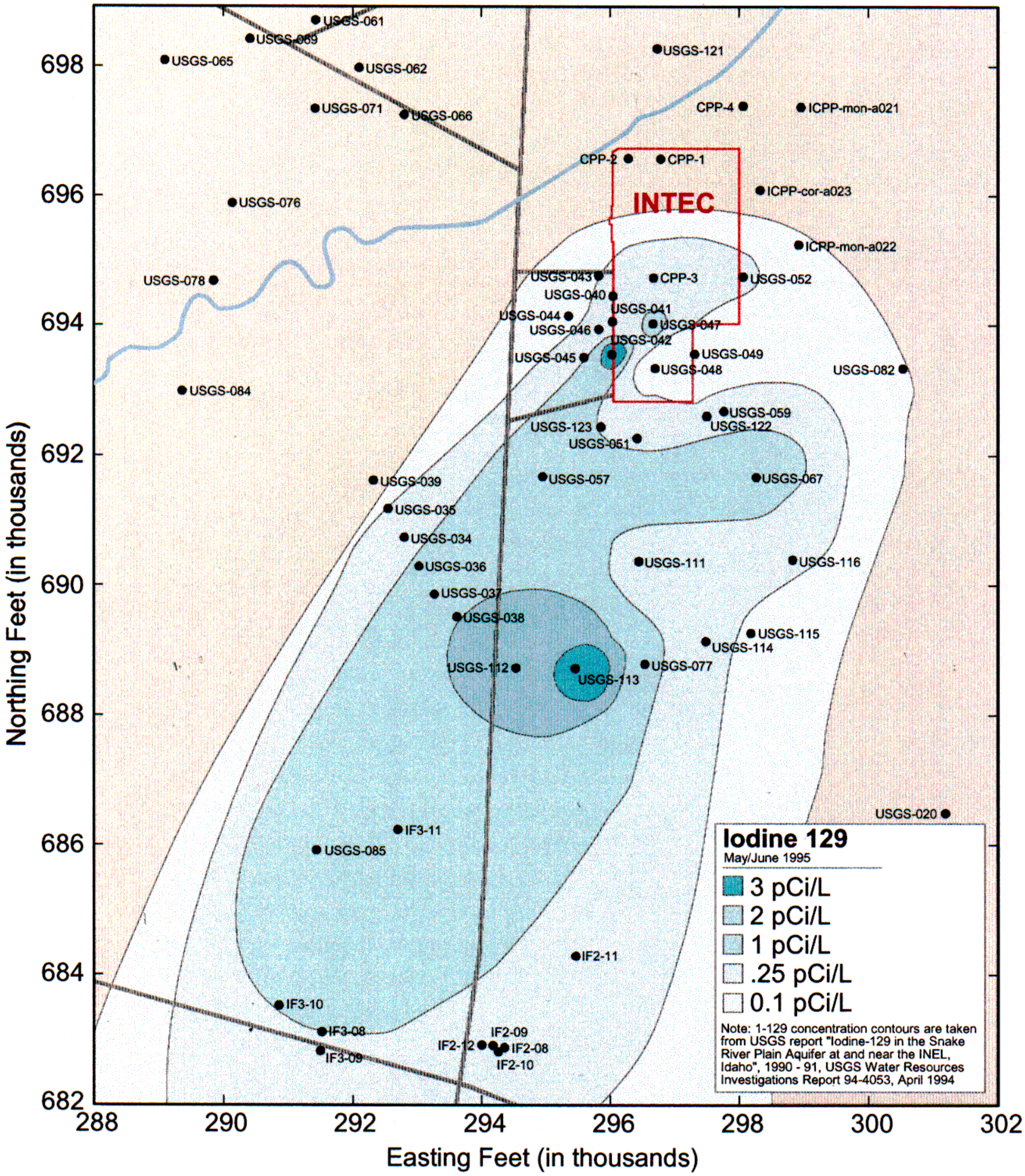

Figure 1-4. Contaminant plume showing where iodine-129 (I-129) has been found to exceed standards (from USGS 1990/1991 data).

4. If observed COC concentrations exceed their action levels at a sustained pumping rate of at least 0.5 gpm for 24 hours, implement pump and treatment RA. Extract contaminated SRPA groundwater from the zone(s) exceeding COC action levels and treat to reduce the contaminant concentrations to meet MCLs by 2095. The action level is the model-predicted maximum concentration that could be present in the year 2000 so that the MCL will not be exceeded in 2095 (the planned end of the institutional control period).

   Implementation**:** Implementation of this remedy is contingent upon the decision obtained under step 3, above. If it is decided that MCLs will not be exceeded in 2095, the contingent pump and treatment RA and associated tasks will not be implemented. If it is decided that MCLs will be exceeded in 2095, additional work planning will be conducted to support this RA (see Appendix H).

5. Standard pump and chemical/physical treatment (which may include evaporation in the INEEL CERCLA Disposal Facility [ICDF] Complex surface impoundment) are anticipated to be able to meet the aquifer restoration goal. Conduct treatability studies, which include a technical evaluation of treating the I-129 and other COCs, as part of this remedy. These studies may include evaluation of the ability to treat and selectively withdraw contaminants from the aquifer. These studies have been estimated to not extend more than 12 months and to be limited to a total cost of $2 million.

   Implementation**:** Implementation of this remedy is contingent upon the decision obtained under step 3, above. If it is decided that MCLs will not be exceeded in 2095, the contingent pump and treatment RA and these associated tasks will not be implemented. If it is decided that MCLs will be exceeded in 2095, additional work planning will be conducted to support this RA (see Appendix H).

6. If the treatability studies indicate the presence of sufficient quantities of I-129 and other COCs, and contaminated groundwater can be selectively extracted and cost-effectively treated to meet the drinking water MCLs outside the INTEC security fence by 2095, then implement active remediation.

   Implementation**:** Implementation of this remedy is contingent upon the decision obtained under step 3, above. If it is decided that MCLs will not be exceeded in 2095, the contingent pump and treatment RA and these associated tasks will not be implemented. If it is decided that MCLs will be exceeded in 2095, additional work planning will be conducted to support this RA.

7. Either return treated water to the aquifer through land recharge in accordance with the Idaho Wastewater Land Application Permit applicable or relevant and appropriate requirements (ARARs) if a recharge impoundment is used or in accordance with National Pollutant Discharge Elimination System (NPDES)/State Pollutant Discharge Elimination System ARARs if the treated effluent is discharged to the Big Lost River, which recharges the aquifer downstream of the INTEC facility; or evaporate in the ICDF Complex evaporation pond or equivalent.

   Implementation**:** Implementation of this remedy is contingent upon the decision obtained under step 3, above. If the decision is reached that MCLs will not be exceeded in 2095, the contingent pump and treatment RA and these associated tasks will not be implemented. If it is decided that MCLs will be exceeded in 2095, additional work planning will be conducted to support this RA.

1.3 Scope

The OU 3-13 ROD requires remediation of the SRPA if assessment of the WAG 3 RI/FS model-predicted contaminant hot spot and contaminant concentration trends indicates the concentrations of the Group 5 COCs will exceed MCLs in 2095 and beyond. This work plan and associated documents present the SOW required to evaluate whether contingent RAs are necessary for OU 3-13, Group 5, SRPA.

Two primary activities will be implemented under this MSIP. The first activity is an evaluation of the model-predicted hot spot to check model accuracy and update groundwater model predictions for COC concentrations in 2095 and beyond. The collection of data to support this task is described in detail in Appendix A, the Plume Evaluation Field Sampling Plan (FSP), as well as in Sections 4 and 5 of this report. The second activity comprises (a) groundwater monitoring to evaluate flux of COCs to Group 5 from Group 4 (the INTEC perched water and vadose zone) and the SRPA beneath the INTEC (inside the security fence) and (b) groundwater monitoring of the INTEC plume outside the INTEC fence. The collection of data to support this groundwater COC trend monitoring is discussed in detail in Appendix B, Long-Term Monitoring Plan (LTMP), as well as in Sections 4 and 5 of this report. A brief description of these two activities is provided below.

1.3.1 Plume Evaluation FSP Scope

The basic objective of the Plume Evaluation FSP scope is to evaluate whether the OU 3-13 RI/FS groundwater modeling is accurate in predicting that a hot spot of primarily I-129 exists south of INTEC in the vicinity of wells USGS-111 and USGS-113 that is of sufficient magnitude to exceed MCLs in 2095 and beyond. This will involve installing four new wells and/or boreholes in the vicinities of the RI/FS modeled I-129-hot spot and the MSIP modeled I-129-hot spot to evaluate the occurrence and magnitude of the hot spot. This data will be analyzed to generate a volumetric estimate of the hot spot where concentrations are predicted to exceed MCLs in 2095 and beyond. If a hot spot is not found, this would be an indication that the OU 3-13 RI/FS groundwater modeling predications are not correct and the model would need to be updated to reflect this finding.

1.3.2 Long-Term Monitoring Plan Scope

The basic objectives of the long-term monitoring actions are to evaluate the contamination in the INTEC groundwater plume outside of the INTEC fence and to evaluate the flux of contaminants into the SRPA outside of the INTEC security fence line (Group 5) from contamination that is currently in the vadose zone and aquifer beneath the footprint of the INTEC facility. These data will be evaluated over time to determine if the flux of COCs into Group 5 will result in exceeding MCLs in 2095 and beyond. This will be accomplished through the long-term periodic sampling and analysis of aquifer monitoring wells in the vicinity of INTEC to track COC concentration trends through the institutional control period.

The wells currently selected for long-term monitoring may be changed based on the results of the baseline sampling and the 5-year review. If additional wells are needed to monitor the SRPA, the LTMP will be revised and a sufficient number of monitoring locations will be chosen to track the groundwater contamination. In addition, the number of wells to be sampled may be expanded every 5 years to allow for evaluation and modifications to the monitoring network.

During the semiannual groundwater sampling event, groundwater samples will be collected using both the high flow (15 – 25 gpm) pumps currently in the wells and using a micropurge method that pumps at approximately 1 gpm at 20 wells. The data from both methods will be evaluated to determine if they are statistically equivalent and compared to historical data trends. Statistical equivalency will be determined by doing a student t-test on the data.

If the micropurge data are determined to be equivalent to the standard sampling data, future groundwater samples will be collected by this method. Adopting the micropurge method will substantially reduce the amount of wastewater generated during sampling and significantly reduce the costs associated with the monitoring program.

1.3.3 Other Projects Implementing Remedy Scope

Other RA elements related to Group 5 are being addressed as projects separate from the SOW of this project. The specific tasks and the projects where they are being handled are as follows:

- Implementation of institutional controls—This work scope is intended to prevent use of perched water while INTEC operations continue and to prevent future drilling into or through the perched zone. This project is being addressed as a part of the Group 8 Institutional Controls Plan.

- Implementation of remedies to control surface water recharge—This work scope is intended to mitigate flux of COCs to the SRPA and Group 5 from the perched water beneath INTEC (inside the security fence), specifically by taking the existing INTEC percolation ponds out of service. The design, construction, and operation of replacement ponds outside the INTEC perched water area following the removal from service of the existing INTEC percolation ponds are being addressed by the OU 3-13 Service Waste Water Discharge Facility project.

1.3.4 Composite Analysis Scope

The WAG 3 RI/FS model did not account for any contaminant sources except soil contamination at Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites. It does not include sources such as the heels that will be left in the tank farm tanks or facility closures. Further the Draft environmental impact statement (EIS) groundwater model includes only high-level waste sources. It does include what is left in the tank heels but not the contaminated soils around the tanks. The EIS sources and the CERCLA OU 3-13 and OU 3-14 sources all need to be added together to capture all the known sources. Future model runs will consider all sources and the relocation of the percolation ponds.

As part of the CERCLA cumulative risk evaluation, the composite analysis of risks via the groundwater pathway from all sources at INTEC will be updated. As new sites are identified, additional information is obtained about existing sites, and various sites are removed or capped, the WAG 3 aquifer model will be updated to account for the change in source terms.

1.4 RD/RA Work Plan Organization

This MSIP was prepared following the methodology outlined in the *Remedial Design and Remedial Action Guidance for the Idaho National Engineering Laboratory* (DOE-ID 1993) and the requirements outlined in the *Guidance on Expediting Remedial Design and Remedial Action* (EPA 1990). The information developed and presented in this MSIP builds on the decisions made and documented in DOE-ID 2000a and DOE-ID 1999.

The organization of the remainder of this MSIP is as follows:

- Section 2. Design Criteria—Provides a description of the project and the design requirements and provisions

- Section 3. Design Basis—Provides a status of the OU 3-13 ROD assumptions, a discussion of the modeling of the SRPA hot spot, and an evaluation of how the project ARARs will be met

- Section 4. Remedial Design—Provides a discussion of the Plume Evaluation FSP and the LTMP design elements

- Section 5. Remedial Action Work Plan—Provides an overview of the remedial action elements, any changes to the RD/RA SOW, an evaluation of performance measures, and a summation of the key guidance documents

- Section 6. Reporting—These reports and reviews include CERCLA 5-year reviews and the assessment of the RA performance

- Section 7. References—Key documents that will be used to guide and direct the execution of the project tasks.

2. DESIGN CRITERIA

2.1 Group 5 Data Quality Objectives

To help with defensible decision making, the EPA has developed the data quality objective (DQO) process, which is a systematic planning tool, based on the scientific method, for establishing criteria for data quality and for developing data-collection designs (EPA 1994a). The DQOs presented below have been developed to guide the Group 5 RD/RA. The process consists of seven iterative steps that yield a set of principal study questions and decision statements that must be answered to address a primary problem statement. The seven steps comprising the DQO process are listed below:

Step 1. State the problem

Step 2. Identify the decision

Step 3. Identify the inputs to the decision

Step 4. Define the study boundaries

Step 5. Develop decision rules

Step 6. Specify limits on the decision

Step 7. Optimize the design for obtaining data.

The DQOs that govern the Group 5 plume evaluation and long-term monitoring are presented separately in the following sections. These objectives were negotiated with, and have the concurrence of, the Agencies.

2.1.1 Plume Evaluation DQOs

The following sections present details on each of the DQO steps to be answered by the work conducted under this FSP. A summary of the HI interbed evaluation DQOs is presented in Table 2-1.

2.1.1.1 State the Problem. The WAG 3 ROD (Section 8, page 8-3) established an RAO for the SRPA as follows: "In 2095 and beyond, (to) ensure that SRPA groundwater does not exceed a cumulative carcinogenic risk of 1×10^{-4}, a total, hazard index of 1; or applicable State of Idaho groundwater quality standards (i.e., MCLs)." Group 5 of WAG 3 is defined as that portion of the SRPA outside of the current INTEC fence line bounded by the contaminant plume that currently exceeds Idaho groundwater quality standards or the federal MCLs for I-129, H-3, and Sr-90. Based upon the above RAO for groundwater, a remediation goal (RG) for Group 5 was also established in the ROD (Section 8.1.5, pages 8-10). The RG is to achieve the applicable State of Idaho groundwater standards or risk-based groundwater concentrations in the SRPA plume south of the INTEC security fence by the year 2095.

The ROD also establishes the means of achieving this goal through a phased approach. The first phase would determine if model-derived action levels for COCs are exceeded. The second phase occurs if the action levels are exceeded. In that case, a contingent pumping and treatment action will be implemented to remove sufficient contaminants to facilitate aquifer restoration by 2095 (ROD, Section 8.1.5, pages 8–10). This drilling program is required to determine if current groundwater concentrations for COCs exceed the modeled action levels and, if they do, can sufficient volume and production rates be achieved by a residential water supply well that would pose a risk to the future groundwater user in the year 2095 and beyond.

Data collected from the drilling program also may be of benefit in the calibration and validation of the present groundwater contaminant predictive model. The model indicates that the principal risk to future groundwater users in the SRPA outside the INTEC facility boundary is the I-129 concentrations in the SRPA (ROD Table 7-8, pages 7–26). From the WAG 3 FSS (DOE-ID 1998) modeling, peak concentrations of I-129 are predicted to remain above MCLs after 2095 in the HI sedimentary interbed while water in the bulk of the aquifer will be below the I-129 MCLs by 2095. However, no empirical data are available to confirm the physical properties of the HI interbed as assumed in the WAG 3 model nor is there any data regarding the presence or absence of high concentrations of I-129 in the interbed. Empirical evidence is required to refine the model predictions and determine whether or not an acceptable risk from I-129 is predicted to exist in 2095 and beyond.

2.1.1.2 Identify the Decisions. This step lays out the principal study questions (PSQs), alternative actions (AAs), and corresponding decision statements that must be answered to effectively address the above stated problem.

2.1.1.2.1 Principal Study Questions—The purpose of the PSQ is to identify key unknown conditions or unresolved issues that, when answered, provide a solution to the problem being investigated, as stated above. The PSQs for this project are as follows:

<u>PSQ-1</u>: Are COC concentration action levels exceeded in the model-predicted hot spot of the groundwater-contaminant plume located to the south of the INTEC facility security fence, and do COCs exceed the concentration action levels anywhere vertically within the groundwater-contaminant plume located to the south of the INTEC security fence?

<u>PSQ-2</u>: Do any zones that exceed COC action levels identified in PSQ-1 yield a sustained flow of greater than 0.5 gpm for a period of 24 hours?

<u>PSQ-3</u>: Does the hot spot exceed the volume action level such that a residential water user may pump from the hot spot for a period of more than one year?

2.1.1.2.2 Alternative Actions—AA are those actions that could possibly result from the resolution of the above PSQs. The types of AA considered will depend on the answers to the PSQs.

<u>AA-1</u>: Based on data indicating the degree of contamination, the alternatives to PSQ-l include proceeding to actions required to define PSQ-2 or to proceed with periodic monitoring.

<u>AA-2</u>: Based on data collected during a 24-hour-pumping test, the alternatives to PSQ-2 include proceeding to actions required to define PSQ- 3 or to proceed with periodic monitoring.

<u>AA-3</u>: Based on volume determinations, the alternatives to PSQ-3 include proceeding to contingent remediation or proceeding with periodic monitoring.

2.1.1.2.3 Decision Statements—The decision statements (DSs) combine the PSQ and AA into a concise statement of action. The DS for each of the PSQs is stated below.

<u>DS-1</u>: Determine whether COC concentration action levels are exceeded in the model-predicted hot spot downgradient of INTEC, requiring additional evaluation of the aquifer water yield from the hot spot.

Aquifer.

Problem Statement A: HI Interbed Contingent Remedy Decision			
		3: Identify Inputs to the Decision	4. Define the Study Boundaries
ctions	Decision Statement		
atives to e proceeding equired to or lapsing onitoring.	DS-1: Determine whether COC concentration action levels are exceeded in the model-predicted hot spot downgradient of INTEC requiring additional evaluation of the aquifer-water yield from the hot spot.	The inputs to PSQ-1 are as follows: • Groundwater model sensitivity analysis of the HI sedimentary interbed characteristics to identify key variables related to HI interbed for long-term predictions of COC concentrations. • Establishing four new wells and/or boreholes in the RI/FS modeled I-129-hot spot and the MSIP modeled I-129-hot spot for groundwater and sedimentary interbed sampling. • Physical characteristics of the HI sedimentary interbed, (identified in the aquifer-model sensitivity analysis), to support model refinement and COC concentration predictions. • Borehole geophysical and fluid logging of four deepened wells, three existing wells, and one new well for location of sampling depths. • Vertical profile sampling (straddle packer) of new wells/boreholes and existing wells for COC concentrations at, above, and below the HI interbed. • A baseline sampling round of 47-aquifer-monitoring wells for I-129, H-3, and Sr-90 to support model refinement and COC concentration predictions. • Model refinement and updated prediction of COC concentrations in 2095 and beyond.	This study will focus on physical characteristics of the HI sedimentary interbed and peak concentrations and distribution of groundwater COCs within the SRPA groundwater contaminant plume south of INTEC. The purpose of the study is to determine if the WAG 3 RI/FS aquifer model is correct in predicting that there will be an unacceptable risk to residential groundwater users outside of the INTEC fence line in excess of 1×10^{-4} (or COCs exceeding MCLs) in the year 2095 and beyond. The potential risk is primarily from I-129, which is predicted by the aquifer model to reside in the HI interbed at concentrations exceeding the RG. The spatial boundary of this study is limited to the area defined as Group 5, SRPA, under the OU 3-13 ROD. This encompasses that portion of the SRPA outside of the INTEC security fence bounded by the groundwater contaminant plume that exceeds Idaho groundwater quality standards of the federal MCLs for I-129, H-3, or Sr-90. Based upon the WAG 3 groundwater model, the area of particular interest within this boundary is an I-129 hot spot south of INTEC in the vicinity of well USGS-113. (**NOTE:** This may be refined by prefield testing sensitivity analysis of HI interbed in the WAG 3 aquifer model.) The estimated depth of the HI interbed in this area is between 100 and 140 ft below the water table, though the aquifer above, within, and below the HI interbed is included in this study. The base of the study area will be the first high permeability zone in the I basalt below the HI interbed, but not to exceed 100 ft below base of HI interbed. The hot spot is predicted to exist within the HI sedimentary interbed below the water table at this location. However, to date, empirical evidence has not been collected that supports the existence of this hot spot, nor has a sensitivity analysis been performed on the WAG 3 model's representation of the HI interbed that resulted in the prediction. It should be noted that practical constrains on the collection of soil and groundwater samples (i.e., poor sample recovery, limitation on packer deployment in rubbley or cavernous zones, etc.) may limit our ability to sample the interbed or SRPA in general at certain zones. This study will be used to determine if contingent groundwater remediation is required to reduce the risk to future groundwater users in the year 2095 and beyond. Thus the current decision of whether or not to implement the contingent remedy will rely on predicted concentrations of COCs as calculated by the refined WAG 3 aquifer model. Prior to 2095, institutional controls will be in place to prevent residential use of groundwater exceeding MCLs or 1×10^{-4} risk concentrations.
atives to cd actions swer PSQ-3 SRPA	DS-2: Determine if the hot spot will yield a groundwater-flow rate of 0.5 gpm for a period of 24 hours.	If the COC action levels are exceeded in PSQ-1, then the inputs to PSQ-2 will be as follows: • A 24-hour/0.5-gpm pumping test(s) of the zones which were identified in PSQ-1 as having COC(s) which exceeded action level(s) • Sampling of the COC(s) during the pumping test.	
atives to e proceeding ingent quifer just lapsing onitoring.	DS-3: Determine if the hot spot is of sufficient size/volume to require contingent remediation.	If required, the inputs to PSQ-3 will be as follows: • An analytical or model-derived volume action level • Evaluation of the COC hot spot volume through the creation of iso-surface maps to calculate the estimated volume.	

Problem Statement A: HI Interbed Contingent Remedy Decision

the Design

presenting the conceptual design of the WAG 3 Group 5 field activities is attached as Figure 2-1 titled "Project flow chart showing conceptual design of field activities." The flow chart details the en to both arrive at a contingent remedy decision and to perform the SRPA interim monitoring. The two separate flow paths are identified on the chart. The following paragraphs describe and ionale for the design of field activities related to the contingent remedy decision.

decision to collect additional COC concentration and SRPA and interbed data prior to making a decision on implementation of the contingent remedy is based upon the need to evaluate the WAG 3 predictions of elevated I-129 concentrations in the SRPA, including the HI interbed, post-2095. Because no physical characteristics or COC concentration data were available from the HI interbed to odel predictions and no sensitivity analysis has been performed, we must collect empirical data on the presence of I-129 in the SRPA and physical properties of the HI interbed south of INTEC to ment of the groundwater model. Given the basis for the field activities prior to conducting the field activities, available field data will be reviewed and a sensitivity analysis on the HI interbed vill be performed. This activity will be performed to identify hydrologic data gaps which will be incorporated in the final sampling and analysis plan for the Group 5 contingent remedy decision. l also be used to refine the predicted I-129 hot spot location, select existing wells for sampling (if any) and to determine if additional wells are required and their locations.

valuation of the RI/FS modeling results and the MSIP modeling results, four new wells/boreholes will be constructed in the vicinity of the predicted and observed I-129-hot spots. The wells will be anner that allows for the collection of sedimentary interbed samples from the HI interbed for analysis of physical characteristics and COC concentrations. Following drilling, borehole geophysical ing will be performed on the newly deepened wells (and three existing wells selected for profiling) to identify sampling locations for COC vertical profile sampling. The geophysical logging will ural gamma, caliper, deviation, and video logging. Borehole fluid logging will consist of borehole flow, temperature, and specific conductivity. These logs will be reviewed prior to groundwater tion to identify the specific zones within each borehole for sampling.

sampling will be conducted using a packer system and sampling pump to isolate the specific zone being sampled. Except for the interbed sampling, one sample will be collected from each sampling of concerns about borehole collapse or sloughing in the interbed, groundwater samples from the interbed will be collected during drilling. The borehole will be extended approximately 5 ft into the he first sample will be taken using a single packer system and will consist of packing off the basalt at the interbed basalt interface. A bottom packer will not be used for the interbed sample. To guard nent getting trapped in the hole, the pump will be placed above the packer and a screen placed below the packer in the interbed. Replicate samples for Tc-99 and I-129 will be collected during ling. The replicate Tc-99 samples will be analyzed and the replicate I-129 sample held in storage until the results are determined for the I-129 and Tc-99 samples. The replicate samples will be Tc-99 to confirm the original sample results. If I-129 is above the action level, the replicate I-129 sample from the interbed will be analyzed. An aquifer stress test, a slug test, will also be performed sampling.

nple collection and analysis, the data will be reviewed to determine if the COC action levels are exceeded in any sampling zone. If the COC action level is exceeded in a zone, the zone will again be packers and pumped for a period of 24 hours to determine if the zone will yield groundwater at a rate of 0.5 gpm for the duration of the test. One water sample will be collected every 4 hours during etermine if the COC action levels are also exceeded throughout the pumping test.

levels are exceeded and the aquifer at the sampling zone(s) yields a sustained 0.5 gpm for a 24-hour period, isopleth maps will be developed from the COC concentration data to estimate the hot spot(s). It is possible that additional wells may be required estimate the hot spot volume. If additional wells are determined necessary, they will be drilled and then tested in the same manner as ve. The final volume estimates will be compared to the model-derived volume action level to determine if it has been exceeded. These results will be reported in the Group 5 monitoring n summary.

e model evaluation and COC predictions discussed above, and to up date information on COC plume dynamics subsequent to the 1991 USGS sampling event, samples will be collected from the er monitoring well network and analyzed for COC concentrations. This sampling will provide additional data to support model predictions of how the aquifer is performing outside of the HI interbed efining of the model predictions. A first round of sampling will be performed including the full INTEC monitoring network (47 wells), with subsequent annual monitoring performed on a limited set oximately 20) specifically identified to support an updated aquifer model calibration.

mpletion of the monitoring report/decision summary, periodic monitoring of the WAG 3 groundwater plume(s) outside of the INTEC security fence line will be implemented. This periodic the plumes will be performed concurrent with the INTEC facility monitoring.

Problem Statement B: INTEC Facility Monitoring

...ctions	Decision Statement	3: Identify Inputs to the Decision	4. Define the Study Boundaries
... actions ...onitoring	DS-1: Determine whether or not the flux of contaminants in the SRPA which originate in the vadose zone within the INTEC security fence line is of sufficient magnitude to exceed the Group 5 RGs in 2095.	The following are inputs to PSQ-1: 1. Sampling of selected wells upgradient of, near the boundary, and within the INTEC security fence line and analysis for COCs. Selected wells will be sampled in the upper 50 ft of the SRPA. 2. Measurement of water table elevations for evaluation of groundwater elevation contours and flow direction. 3. Periodic incorporation of new data and update of the WAG 3 OU 3-13 aquifer numerical model for prediction of COC concentrations in the SRPA at 2095 and beyond.	This study will focus on the SRPA beneath the INTEC facility and near the boundary of the facility. The area of focus along the INTEC boundary is the south and west boundaries given the south-southwest direction of groundwater flow in this region. The primary sources of contaminants to the aquifer include both the perched water/vadose zone above SRPA and the former injection well which penetrates the aquifer and HI interbed. Two principal study questions have been identified to evaluate these sources separately. The portion of the aquifer that is likely to be affected by contaminants transported through the vadose zone is the upper 50 ft of the aquifer above the HI interbed. Because the former injection well penetrated the HI interbed, the portion of the aquifer potentially affected by the injection well includes both the upper zone from the water table to the HI interbed and the lower zone beneath the HI interbed. The total depth of the former injection well was 598 ft. Accordingly the base of the study boundary should correspond to the total depth of injection, or approximately 600 ft below land surface. Monitoring the concentrations of COCs above and below the HI interbed and as far downgradient as indicated by the detections of COCs above MCLs. Because the RG is established in the year 2095, this study will continue through the institutional control period to at least 2095.
...e actions ...onitoring	DS-2: Determine whether or not the flux of contaminants in the SRPA from the former INTEC injection well is of sufficient magnitude to exceed the Group 5 RGs in 2095.	The following are inputs to PSQ-2: 1. Borehole geophysical and fluid logging of selected wells which penetrate the HI interbed for selection of wells and sampling zones below the HI interbed for selection of wells and sampling zones below the HI interbed downgradient of the former injection well. 2. Isolation through packers or other method(s), sampling, and analysis for COCs of selected well zones below the HI interbed downgradient of the former injection well. 3. Measurement of water table elevations for evaluation of groundwater elevation contours and flow directions, and possibly head gradient between aquifer above and below the HI interbed. 4. Periodic incorporation of new data and update of the WAG 3 OU 3-13 aquifer numerical model for prediction of COC concentrations in the SRPA at 2095 and beyond. **NOTE:** Isolation of sampling zone(s) beneath the HI interbed depth from selected wells should not preclude also sampling of zone(s) above the HI interbed from the same well to supply inputs for PSQ-1.	
...e actions ...onitoring	DS-3: Determine whether or not the COCs in the SRPA outside the INTEC	The following are inputs to PSQ-3: 1. Sampling of selected wells downgradient of the INTEC security fence and analysis for COCs. Selected wells will monitor contaminants above MCLs and monitor the downgradient plume	

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resenting the conceptual design of the WAG 3 Group 5 field activities entitled "Project flow chart showing conceptual design of field activities," is shown in Section 2, Figure 2-1. The flow chart
s to be taken to both arrive at a contingent remedy decision and to perform the SRPA interim monitoring. The two separate flow paths are identified on the chart. The following paragraphs describe
rationale for the design of field activities related to the contingent remedy decision.

s are available in the vicinity of INTEC suitable for groundwater monitoring. From that set of wells, 11 are selected for the INTEC facility monitoring program to support PSQ-1, monitoring of the
put from the vadose zone to the SRPA. The PSQ-1 INTEC facility monitoring shall consist of groundwater sample collection from wells located upgradient of, within, and adjacent to the INTEC
ells selected for monitoring include MW-18, USGS-40, USGS-42, USGS-47 through -49, USGS-51, USGS-52, and USGS-122 through USGS-123 (see Section 4, for a figure showing well
well, USGS-121, was selected upgradient of the contaminant source areas at INTEC to provide background groundwater quality data. Though this well is not directly upgradient of the INTEC
cated nearer to the groundwater flow paths from potential sources of upgradient contamination (TRA or NRF) than other wells and is, in that respect, well suited for providing upgradient water
everal wells were selected inside the INTEC facility (MW-18, USGS-47, USGS-48, USGS-49, and USGS-52) to help distinguish between the possible sources of groundwater contaminants located
INTEC facility. Wells USGS-40, USGS-42, USGS-51, USGS-122, and USGS-123 were selected because they are located along the southern and western boundaries of INTEC. The general
oundwater flow beneath INTEC is interpreted to be to the south-southwest. The selected wells are considered adequate for the INTEC facility monitoring and no new wells are considered necessary
owever, additional wells are currently planned for various other monitoring programs at INTEC. As these wells become available, they will be considered for inclusion into the INTEC facility
gram.

s selected for monitoring in support of PSQ-2, former injection well monitoring, are USGS-41, USGS-48, and USGS-59 based upon an evaluation of their suitability for monitoring the aquifer
nterbed. There are 12 USGS wells in the vicinity of INTEC and the former injection well that penetrate the HI interbed and remain as open boreholes in the aquifer, potentially suitable for
itoring of the aquifer beneath the HI interbed (excluding INTEC production wells which are required for facility support and cannot be modified to sample below the HI interbed). The wells are
ugh-49, USGS-51, USGS-52, and USGS-59. These wells are located either cross-gradient or downgradient of the former injection well. An evaluation of available data from and additional
d borehole fluid logging of these wells will be performed to determine if they are suitable for deep sampling and to identify potential zones for sampling. It should be noted that an upgradient
ll which penetrates the HI interbed is not available within the existing monitoring well network at INTEC. Well USGS-121 does not penetrate the HI interbed. Production wells CPP-1, CPP-2, and
en drilled through the HI interbed and have perforated well-casing both above and below the HI interbed but are of limited use as monitoring wells based upon their required support of INTEC
e need for an upgradient monitoring well in this zone will be evaluated after the monitoring program is initiated. If the data obtained from the facility monitoring program indicate that the injection
source may cause or contribute to not meeting the Group 5 RAO/RGs, an upgradient well will be installed for sampling beneath the HI interbed to ensure that an upgradient source is not present. It
noted that current plans for OU 3-14 investigation include the installation of monitoring well in the immediate vicinity of the former injection well. As these well(s) become available, they will be
nto the INTEC facility monitoring well program to provide additional data in the vicinity of the injection well secondary source.

he above monitoring, one sampling round will be conducted using the entire INTEC monitoring network at the onset of the activities outlined in the LTMP. This sampling event will provide a
he current state of the contamination of the SRPA in the vicinity of the INTEC facility and provide a data set to compare the COC flux monitoring data. In addition, these data will be used to
3-13 numerical aquifer model. In support of Group 4 activities, groundwater samples collected during the baseline sampling event from USGS-40, -42, -47, -48, -49, -51, -121, -122, -123, and
e analyzed for stable isotopes including oxygen, hydrogen, and nitrogen. In addition to the analytes listed below, metals and anions will be included in the semiannual and micropurge sampling.

been selected for long-term monitoring of the INTEC plume beyond the facility boundary in support of PSQ-3. The wells selected for long-term monitoring are USGS-57, USGS-67, USGS-112,
SGS-85, and LF3-08. These wells were selected based on a review of the historical data for I-129. However, most of the data used to select these wells for long-term monitoring is from 1990–1991;
aseline groundwater sampling data will be used to optimize the well locations and the total number of wells for long-term monitoring.

erest include COCs which currently exist in the SRPA at concentrations exceeding either MCLs or risk-based concentrations as well as COCs derived from the modeling which are predicted to
se a future unacceptable risk to the SRPA. Contaminants that currently exceed MCLs or risk-based concentrations and will be included in the INTEC facility monitoring program are I-129, H-3,
taminants that are predicted by the WAG 3 RI/FS modeling to exceed MCLs or risk-based concentrations at a future date and are included in the INTEC facility monitoring program are plutonium
otopes, Np-237, Am-241, and mercury. Chromium, while listed as a COC, is excluded because it is specifically related to groundwater contamination at TRA. Also, because Tc-99 is a contributor
nitting radionuclides limit and present at significant concentrations in the aquifer beneath INTEC, it is included in the list of analytes for INTEC facility monitoring. To evaluate additional
hat may be present but not accounted for in the modeling, gross-alpha and gross-beta analyses will also be performed. Finally, the list of analytes will be updated through either the exclusion of
or inclusion of additional analytes as analytical data are accumulated or new information regarding contaminant sources is identified. The detection limits for I-129, Sr-90, and tritium required to
ions needed concerning the contingent remedy are 0.1 pCi/L, 0.8 pCi/L and 2000 pCi/L, respectively.

analyses will occur at the following frequency:

1	Baseline and Semiannual	Gross-alpha/beta, Hg, tritium, Tc-99, I-129, Sr-90, plutonium isotopes (Pu-238, -239, -240, and –241), uranium isotopes (U-234, -235, and -238), Am-241, Np-237, Cs-137; metals and anions in semiannual and micropurge sampling only.
s 2–7	Annual	Gross-alpha/beta, Hg, tritium, Tc-99, I-129, Sr-90, plutonium isotopes (Pu-238, -239, -240, and –241), uranium isotopes (U-234, -235, and –238), Am-241, Np-237, Cs-137
s 8–16	Biannual (once every two years)	Review and adjust as required

DS-2: Determine if the hot spot will yield a groundwater flow rate of 0.5 gpm for a period of 24 hours, requiring additional evaluation of the aquifer water hot spot volume.

DS-3: Determine if the hot spot is of sufficient size/volume to require contingent remediation. This step identifies the informational inputs that are required to answer the DS made above.

2.1.1.2.4 Inputs for PSQ-1—

1. Groundwater model sensitivity analysis of the HI sedimentary interbed characteristics to identify key variables related to HI interbed for long-term predictions of COC concentrations

2. Four additional well/boreholes will be installed in the vicinities of the RI/FS modeled hot-spot and the MSIP modeled hot-spot I-129 hot spots for groundwater and sedimentary interbed sampling

3. Physical characteristics of the HI sedimentary interbed (saturated hydraulic conductivity, bulk density, grain size, distribution, and porosity estimate) will be identified in the aquifer model sensitivity analysis to support model refinement and COC concentration predictions

4. Borehole geophysical and fluid logging of the new wells and three existing wells for location of sampling depths

5. Vertical profile sampling (straddle packer) of four deepened wells, three existing wells, and one new well for I-129, H-3, and Sr-90 concentrations at, above, and below the HI interbed

6. A baseline sampling round of 47-aquifer-monitoring wells for I-129, H-3, and Sr-90 to support model refinement and COC concentration predictions

7. Model refinement and updated prediction of COC concentrations in 2095 and beyond.

2.1.1.2.5 Inputs for PSQ-2—If the COC action levels are exceeded in PSQ-1, then a pumping test will be conducted to determine if the hot spot zone will yield groundwater at a rate of 0.5 gpm for a period of 24 hours. The zone(s) exceeding action levels as determined by sampling performed for PSQ-1 will be pump-tested for a 24-hour period. During the pumping test, discharge water will be sampled to determine if COC concentrations exceed the action level throughout the pumping period. Thus, the inputs for PSQ-2 are

1. A 24-hour/0.5-gpm pumping test(s) of the zones that were identified in PSQ-1 as having COC(s) that exceeded action level(s)

2. Sampling of the discharge water for COC(s) during the pumping test.

2.1.1.2.6 Inputs for PSQ-3—If the results of studies performed for PSQ-1 and PSQ-2 indicate that further action is necessary, PSQ-3 will be implemented to determine what the volume of the hot spot(s) is and whether the volume of the hot spot will sustain pumping for a period of one year. The volume action level will need to be determined based upon either analytical or numerical modeling techniques. Three-dimensional isopleth maps will be prepared from this information to estimate the volume of the hot spot that exceeds the COC action levels. Therefore, if required, the inputs to PSQ-3 will be

1. An analytical or model-derived volume action level

2. Evaluation of the COC hot spot volume through the creation of iso-surface maps to calculate the estimated volume.

2.1.1.3 Define the Boundaries of the Study.

This study will focus on physical characteristics of the HI sedimentary interbed and peak concentrations and distribution of groundwater COCs within the SRPA groundwater contaminant plume south of INTEC. The purpose of the study is to determine if the WAG 3 RI/FS aquifer model is correct in predicting that there will be an unacceptable risk to residential groundwater users outside the INTEC fence line in excess of 1×10^{-4} or COCs exceeding MCLs in the year 2095 and beyond. The potential risk is primarily from I-129, which is predicted by the aquifer model to reside in the HI interbed at concentrations exceeding the RG.

The spatial boundary of this study is limited to the area defined as Group 5, SRPA, under the OU 3-13 ROD. This encompasses that portion of the SRPA outside the INTEC security fence bounded by the groundwater contaminant plume that exceeds Idaho groundwater quality standards and the federal MCLs for I-129, H-3, or Sr-90. Based upon the WAG 3 groundwater model, the area of particular interest within this boundary is an I-129 hot spot south of INTEC in the vicinity of USGS-113 Well. The estimated depth of the HI interbed in this area is between 30 and 43 m (100 and 140 ft) below the water table, though the aquifer above, within, and below the HI interbed is included in this study. An additional area of interest lies further south near the CFA landfill wells (LF2 and LF3 series) where MSIP modeling indicates elevated I-129 concentrations. The base of the study area will be the first high permeability zone in the I basalt below the HI interbed, but not to exceed 30 m (100 ft) below base of HI interbed. The hot spot is predicted to exist within the HI sedimentary interbed below the water table at this location. However, to date, empirical evidence has not been collected that supports the existence of this hot spot, nor has a sensitivity analysis been performed on the WAG 3 model of the HI interbed that resulted in the prediction.

It should be noted that practical constraints on the collection of soil and groundwater samples (i.e., poor sample recovery, limitations on packer deployment in highly fractured or cavernous zones, etc.) may limit our ability to sample the interbed or SRPA at certain zones. This study will be used to determine if contingent groundwater remediation is required to reduce the risk to future groundwater users in the year 2095 and beyond. Thus, the current decision of whether to implement the contingent remedy will rely on predicted concentrations of COCs as calculated by the refined WAG 3 aquifer model.

Prior to 2095, institutional controls will be in place to prevent residential use of groundwater exceeding MCLs or 1×10^{-4} risk concentrations.

2.1.1.4 Develop a Decision Rule.

This step brings together the outputs from Steps 1 through 4 into a single statement describing the basis for choosing among the listed alternatives. The decision rules guiding this investigation are basically set forth in Figure 11-6, on page 11-24 of the WAG 3 ROD (DOE-ID 1999). Three criteria must be met prior to a positive decision to implement contingent remediation:

Decision Rule (DR)-l: If any COC exceeds its action level at any sampling zone, then we must determine if the aquifer at that zone is also capable of producing a sustained yield of 0.5 gpm for a period of 24 hours. If COC action levels are not exceeded at any sampling location, then we will proceed with SRPA monitoring (i.e., periodic monitoring).

DR-2: If the aquifer is capable of producing 0.5 gpm for a period of 24 hours from a zone that also exceeds COC action levels, then we must determine the volume of the hot spot. If the zone does not produce 0.5 gpm for 24 hours, then we will proceed with SRPA monitoring.

DR-3: If the volume of the COC hot spot is sufficiently large such that a future groundwater user could pump from the hot spot for a period of more than one year, then we are required to proceed with the contingent remedy. If the hot spot does not exceed the volume-action level, then we will proceed with SRPA long-term monitoring.

2.1.1.5 Specify Tolerable Limits on Decision Errors. Five types of new information may be collected or developed during this study: (1) laboratory analytical data from groundwater samples, (2) borehole geophysical logs, (3) aquifer test results, (4) groundwater numerical modeling results, and (5) sedimentary interbed physical charcterization (i.e., saturated hydraulic conductivity, bulk density, grain size distribution, and porosity). Because of the nature of logging and aquifer testing studies, statistically based decision error limits are not applicable and not required. Modeling information derived from the analytical data will not be directly amenable to statistical evaluation. Standard modeling error evaluation will be utilized to review the modeling results.

Laboratory analytical data collected during this study to determine if an action level is exceeded are amenable to statistically based limits on decision errors. Hypothesis testing will be utilized to determine if an action level is exceeded at any sampling point to resolve PSQ-1. The recommended null hypothesis, H_0, is that the true mean groundwater concentration for each COC is greater than or equal to the action level. The alternative hypothesis is that the mean is less that the action level:

$$H_0: \mu \geq \text{Action Level}$$

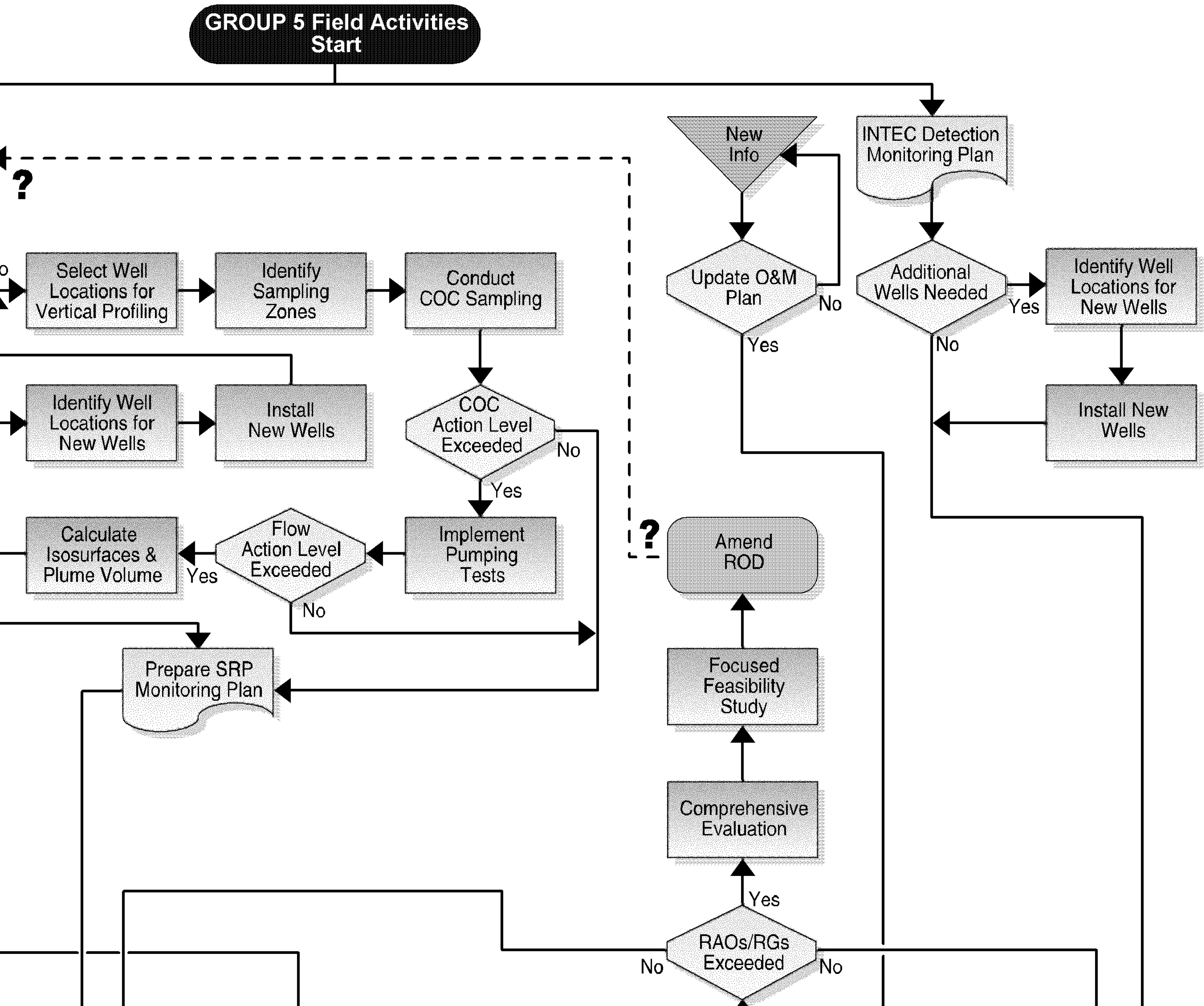
$$H_a: \mu < \text{Action Level.}$$

This hypothesis testing will be based upon small sample statistics (n<30; where n is the total number of measurments) and utilize the t-test statistic:

$$\text{Test Statistic: } t = \frac{\bar{x} - hypothesized value}{s / \sqrt{n}}.$$

Using this test statistic and hypothesis, we would reject the null hypothesis (and thereby accept the alternative hypothesis) if the test statistic t is less than the negative value of the t critical value obtained from standard math tables, given our number of samples and desired level of significance. This hypothesis testing will be performed to a level of significance, or α, of 0.05. In other words, with this level of significance and null hypothesis, we limit the probability of a Type 1 error, or of rejecting the null hypothesis when it is in fact true, to only 5%. The proposed hypothesis testing is designed to allow us to control the probability of erroneously concluding that COC action levels are not exceeded when in fact they are exceeded. This null hypothesis was formulated based upon our belief that the harmful consequences of incorrectly concluding that an action level is not exceeded, when it actually is, is greater than the consequences of incorrectly concluding that the action level is exceeded when in fact it is not.

2.1.1.6 Optimize the Design. A project flowchart, presenting the conceptual design of the WAG 3 Group 5 field activities, is shown in Figure 2-1. The flowchart details the steps to be taken to both arrive at a contingent remedy decision and to perform the SRPA interim monitoring. The two separate flow paths are identified on the chart. The following paragraphs describe the rationale for the design of field activities related to the contingent remedy decision. The Group 5 decision to collect additional COC concentration and SRPA and interbed data prior to making a decision on implementation of the contingent remedy, is based upon the need to evaluate the WAG 3 RI/FS model predictions of elevated I-129 concentrations in the SRPA, including the HI interbed, in 2095 and beyond. Because no physical characteristics or COC concentration data were available from the HI interbed to confirm the model



GROUP 5 Field Activities Start
INTEC Detection Monitoring Plan
New Info
Update O&M Plan
Additional Wells Needed
Identify Well Locations for New Wells
Install New Wells
Select Well Locations for Vertical Profiling
Identify Sampling Zones
Conduct COC Sampling
Identify Well Locations for New Wells
Install New Wells
COC Action Level Exceeded
Implement Pumping Tests
Flow Action Level Exceeded
Calculate Isosurfaces & Plume Volume
Prepare SRP Monitoring Plan
Amend ROD
Focused Feasibility Study
Comprehensive Evaluation
RAOs/RGs Exceeded
Yes
No
?

predictions, and no sensitivity analysis has been performed, we must collect empirical data on the presence of I-129 in the SRPA and physical properties of the HI interbed south of INTEC to support refinement of the groundwater model.

Presently, there are no wells inside the hot spots that penetrate to or through the HI interbed. The criterion for placement of the new wells/boreholes will be based upon the RI/FS modeled I-129-hot spot and the MSIP modeled hot spot. To address the project DQOs, it is necessary to collect data in interbed geophysical parameters, the HI interbed thickness, aquifer water COC concentrations, and aquifer conductivity. To collect these data, four additional wells/boreholes will be installed by coring through the HI interbed to the first zone of high permeability in the I basalt flow ('I' is the nomenclature for basalt flow located beneath the HI interbed stratigraphic unit) (Anderson and Lewis 1991) below the HI interbed, but not to exceed 30 m (100 ft) below the interbed base.

Groundwater sampling will be conducted using a packer system and sampling pump to isolate the specific zone being sampled. Except for the interbed samples, one sample will be collected from each sampling zone. Because of concerns about borehole collapse or sloughing in the interbed, water samples from the interbed will be collected on the way down during drilling. The borehole will be extended approximately 1.5 m (5 ft) into the interbed. The first sample will be taken using a single packer system and will consist of packing off the basalt at the interbed basalt interface. A bottom packer will not be used for the interbed sampling. To guard against equipment getting trapped in the hole, the pump will be placed above the packer and a screen placed below the packer in the interbed. Replicate samples for Tc-99 and I-129 will be collected during interbed sampling. The replicate Tc-99, samples will be analyzed and the replicate I-129 sample held in storage until the results are determined for the I-129 and Tc-99 samples. The replicate samples will be analyzed for Tc-99 to confirm the original sample results. If I-129 is above the action level, the replicate I-129 sample will be analyzed. An aquifer-stress test (a slug test) will also be performed at the time of sampling.

Following sample collection and analysis, the data will be reviewed to determine if the COC action levels are exceeded in any sampling zone. If the COC action level is exceeded in a zone, the zone will again be isolated with packers and pumped for a period of 24 hours to determine if the zone will yield groundwater at a rate of 0.5 gpm for the duration of the test. One water sample will be collected every four hours during pumping to determine if the COC action levels are also exceeded throughout the pumping test.

If COC action levels are exceeded and the aquifer at the sampling zone(s) yields a sustained 0.5 gpm for a 24-hour period, isopleth maps will be developed from the COC concentration data to estimate the volume of the hot spot(s). It is possible that additional wells may be required to estimate the hot spot volume. If additional wells are determined necessary, they will be drilled and then tested in the same manner as described above. The final volume estimates will be compared to the model-derived volume action level to determine if it has been exceeded. These results will be reported in the Group 5 monitoring report/decision summary.

2.1.2 Long-Term Monitoring DQOs

The following sections present details on each of the DQO steps to be answered by the work conducted under this LTMP. A summary of INTEC facility monitoring DQOs is presented in Table 2-1.

The possibility of COC flux in the SRPA originating from sources within INTEC, either in the vadose zone or in the vicinity of the former INTEC injection well, must be quantified. The concentration of contaminants downgradient of INTEC also needs to be monitored. These data can be used to update and refine the OU 3-13 numerical groundwater model to better predict the state of the aquifer in 2095.

2.1.2.1 *Identify the Decision.* This step of the DQO process lays out the principal study questions, alternative actions, and corresponding decision statements that must be answered to effectively address the problem stated above. The RG for OU 3-13, Group 5 is "Achieving the applicable State of Idaho groundwater standards or risk-based groundwater concentrations in the SRPA plume south of the INTEC security fence by the year 2095" (ROD, Sec. 8.1.5, pg 8-10). To determine if this goal will be met, the input of contaminants to Group 5 from the contaminated aquifer within the INTEC security fence and the distribution of contaminants in the aquifer outside the INTEC security fence must be determined. To further assist in this evaluation, the groundwater modeling conducted as part of the OU 3-13 RI/FS will be utilized and refined with data collected under this LTMP.

2.1.2.1.1 *Principal Study Questions*—The purpose of the PSQ is to identify key unknown conditions or unresolved issues that, when answered, provide a solution to the problem being investigated. The PSQs for this project are the following:

PSQ-1: Is the COC flux in the SRPA from the contaminated media in the vadose zone within the INTEC security fence of sufficient magnitude to prevent achieving the Group 5 RGs (RGs)?

PSQ-2: Is the COC flux in the SRPA from the contaminated sediments/sludges remaining in the former ICPP injection well (CPP-3) and immediate vicinity of sufficient magnitude to prevent achieving the Group 5 RGs?

PSQ-3: Are the COC concentrations in the SRPA outside the INTEC facility of sufficient magnitude to prevent achieving the Group 5 RGs?

2.1.2.1.2 *Alternative Actions*—Alternative actions are those actions resulting from resolution of the above PSQs. The types of actions considered will depend on the answers to the PSQs.

2.1.2.1.3 *Decision Statements*—The DSs combine the PSQs and alternative actions into a concise statement of action. The DSs are

DS-1: Determine whether the flux of contaminants in the SRPA that originate in the vadose zone within the INTEC security fence is of sufficient magnitude to exceed the Group 5 RGs in 2095.

DS-2: Determine whether the flux of contaminants in the SRPA from the former INTEC injection well is of sufficient magnitude to exceed the Group 5 RGs in 2095.

DS-3: Detemine whether the COCs in the SRPA outside the INTEC facility will exceed the Group 5 RGs in 2095.

It is important to realize that the installation of an updated monitoring system and collection of new types of data during the SRPA monitoring might modify the site conceptual model for vadose zone flow and transport beneath WAG 3. If the conceptual model is significantly changed, DS-1 and DS-2 may need to be reevaluated accordingly.

2.1.2.2 *Identify Inputs to the Decision.* This step of the DQO process identifies the informational inputs that are required to answer the DSs made above.

2.1.2.2.1 *Inputs for PSQ-1*—PSQ-1 will be answered by collecting data on the COC flux originating in the vadose zone within the INTEC security fence, updating the OU 3-13 aquifer numerical model, and evaluating the predictions of the updated aquifer numerical model for COC concentrations in 2095.

Inputs to PSQ-1 are

1. Samples of selected wells upgradient of, near the boundary of, and within the INTEC security fence line, and analysis for COCs. Selected wells will sample in the upper 15 m (50 ft) of the SRPA.

2. Measurements of water table elevations for evaluation of groundwater elevation contours and flow direction.

3. Periodic incorporation of new data and update of the OU 3-13 aquifer numerical model for prediction of COC concentrations in the SRPA at 2095 and beyond.

2.1.2.2.2 Inputs for PSQ-2—PSQ-2 will be answered by collecting measurements of COC flux originating from the former injection well within the INTEC security fence, updating the OU 3-13 aquifer numerical model, and evaluating the predictions of the updated aquifer numerical model for COC concentrations in 2095.

Inputs to PSQ-2 are

1. Borehole geophysical and fluid logging of selected wells that penetrate the HI interbed for selection of wells and sampling zones below the HI interbed downgradient of the former injection well

2. Isolation through packers or other method(s), sampling, and analysis for COCs of selected well zones below the HI interbed downgradient of the former injection well

3. Measurements of water table elevations to contour of groundwater elevations and to determine flow direction, and possibly head gradient between the aquifer above and below the HI interbed

4. Periodic incorporation of new data and update of the OU 3-13 aquifer numerical model for prediction of COC concentrations in the SRPA in 2095 and beyond.

Isolation of sampling zone(s) beneath the HI interbed depth from selected wells should not preclude the sampling of zone(s) above the HI interbed from the same well to supply inputs for PSQ-2.

2.1.2.2.3 Inputs for PSQ-3—PSQ-3 will be answered by collecting measurements of COCs in the aquifer beyond the INTEC security fence line and by updating the OU 3-13 aquifer numerical model.

The inputs to PSQ-3 are

1. Sampling of selected wells downgradient of the INTEC security fence and analysis for COCs. Selected wells will monitor contaminants above MCLs and monitor the downgradient plume area above MCLs.

2. Measurement of water elevations for evaluation of groundwater elevation contours and flow direction.

3. Periodic incorporation of new data into the OU 3-13 aquifer numerical model for the prediction of COC concentrations in the SRPA in 2095 and beyond.

2.1.2.3 Define the Boundaries of the Study. This study will focus on the SRPA beneath INTEC, near the boundary of the facility and downgradient of the facility. The area of focus is the south and west boundaries because of the south-southwest direction of groundwater flow in this region.

The primary sources of contaminants to the aquifer include both the perched water/vadose zone above SRPA and the former injection well that penetrates the aquifer and HI interbed. Two PSQs have been identified to evaluate these sources separately.

The portion of the aquifer that is likely to be affected by contaminants transported through the vadose zone is the upper 15 m (50 ft) of the aquifer above the HI interbed.

Because the former injection well penetrated the HI interbed, the portion of the aquifer potentially affected by the injection well includes both the upper zone from the water table to the HI interbed and the lower zone beneath the HI interbed. The total depth of the former injection well was 182 m (598 ft). Accordingly, the base of the study boundary should correspond to the total depth of injection, or approximately 183 m (600 ft) bgs.

The third PSQ addresses monitoring of contaminants already present in Group 5 downgradient of INTEC. The long-term plume monitoring will monitor the concentrations of COCs as far downgradient of the INTEC facility as indicated by the detection of COCs above MCLs.

Because the RG is established in the year 2095, this study will continue through the institutional control period to at least 2095.

2.1.2.4 Develop a Decision Rule. This step of the DQO process brings together the outputs from Steps 1 through 4 into a single statement describing the basis for choosing among the listed alternatives. If the monitoring activities and model predictions generated for this study indicate that Group 5 RAOs/RGs will be exceeded due to the flux of contaminants in the SRPA beneath INTEC, then a comprehensive evaluation, focused feasibility study, and ROD amendment will be prepared to address the risks posed by groundwater contaminants beneath INTEC. If it is determined that the RAOs/RGs will be met, monitoring will continue until 2095 or until the Agencies determine that no unacceptable risk exists from Group 5.

The decision is based upon model predictions using data obtained from an observational well network to model evolution of the plume.

2.1.2.5 Specify Tolerable Limits on Decision Errors. This step of the DQO process specifies acceptable limits on decision error. These limits are used to establish performance goals for the data collection design. In this case, the decisions will be made by evaluating computer predictions, and thus, the accuracy of the computer predictions will bound the tolerable limits on the decision errors.

2.1.2.6 Optimize the Design. A flow chart presenting the conceptual design of the Group 5 field activities is provided in Section 2, Figure 2-1. The flow chart details the steps to be taken to both arrive at a contingent remedy decision and to perform the SRPA interim monitoring. The two separate flow paths are identified on the chart. The following paragraphs describe the rationale for the design of field activities related to the contingent remedy decision.

Thirty-six wells that are available in the vicinity of INTEC are suitable for groundwater monitoring. From that set of wells, 11 are selected for the INTEC facility monitoring program to support

PSQ-1, monitoring of the contaminant input from the vadose zone to the SRPA. The PSQ-1 INTEC facility monitoring will consist of groundwater-sample collection from wells located upgradient of, within, and adjacent to INTEC. The wells selected for monitoring include MW-18, USGS-40, USGS-42, USGS-47 through USGS-49, USGS-51, USGS-52, USGS-122, and USGS-123 (Figure 4-1 gives well locations). One well, USGS-121, was selected upgradient of the contaminant source areas at INTEC to provide background groundwater quality data. Though this well is not directly upgradient of the INTEC facility, it is located nearer to the groundwater flow paths from potential sources of upgradient contamination (TRA or Naval Reactors Facility) than other wells and is, in that respect, well suited for providing upgradient water quality data. Several wells were selected inside INTEC (MW-18, USGS-47, USGS-48, USGS-49, and USGS-52) to help distinguish between the possible sources of groundwater contaminants. Wells USGS-40, USGS-42, USGS-51, USGS-122, and USGS-123 were selected because they are located along the southern and western boundaries of INTEC. The general direction of groundwater flow beneath INTEC is interpreted to be to the south-southwest. The selected wells are considered adequate for the INTEC facility monitoring and no new wells are considered necessary at this time. However, additional wells are currently planned for various other monitoring programs at INTEC. As these wells become available, they will be considered for inclusion into the INTEC facility-monitoring program.

The three wells selected for monitoring in support of PSQ-2, former injection well monitoring, are USGS-41, USGS-48, and USGS-59, based upon an evaluation of their suitability for monitoring the aquifer below the HI interbed. There are 12 USGS wells in the vicinity of INTEC and the former injection well that penetrate the HI interbed and remain as open boreholes in the aquifer, potentially suitable for long-term monitoring of the aquifer beneath the HI interbed (excluding INTEC production wells that are required for facility support and cannot be modified to sample below the HI interbed). The wells are USGS-40 through USGS-49, USGS-51, USGS-52, and USGS-59. These wells are located either cross-gradient or downgradient of the former injection well. An evaluation of available data from, and additional geophysical and borehole fluid logging of, these wells will be performed to determine if the selected wells are suitable for deep sampling and to identify potential zones for sampling. (Note: because these wells are completed with an open borehole, there is a significant possibility that the deeper portions of one or more of these may be obstructed, requiring the selection of an alternate well from the 12 wells identified above.) It should be noted that an upgradient monitoring well that penetrates the HI interbed is not available within the existing monitoring well network at INTEC. Well USGS-121 does not penetrate the HI interbed. Production wells CPP-1, CPP-2, and CPP-4 have been drilled through the HI interbed and have perforated well casing both above and below the HI interbed but are of limited use as monitoring wells based upon their required support of INTEC operations. The need for an upgradient monitoring well in this zone will be evaluated after the monitoring program is initiated. If the data obtained from the facility monitoring program indicate that the injection well may cause or contribute to not meeting the Group 5 RAO/RGs, an upgradient well will be installed for sampling beneath the HI interbed to ensure that there is no upgradient contaminant source present. Also, current plans for OU 3-14 investigation include the installation of a monitoring well in the immediate vicinity of the former injection well. As the additional well(s) become available, they will be incorporated into the INTEC facility monitoring well program to provide additional data in the vicinity of the injection well.

In addition to the above monitoring, one sampling round will be conducted using the entire INTEC monitoring network at the onset of the activities outlined in this LTMP. This baseline sampling event will provide information on the current state of the contamination of the SRPA in the vicinity of INTEC and provide a data set to compare the COC flux monitoring data. These data will be used to update the OU 3-13 numerical aquifer model. In support of Group 4 activities, groundwater samples collected during the baseline sampling event from USGS-40, USGS-42, USGS-47–49, USGS-51–52, USGS-121–123 and MW-18 will be analyzed for stable isotopes, including oxygen, hydrogen, and nitrogen.

Micropurge samples will be collected from the 20 wells in the semiannual sampling in the first year. The standard samples and the micropurge data will be analyzed by statistical methods to determine if the data are comparable. If the data sets are comparable, the micropurge method will be used to collect future samples. Statistical equivalency will be determined by doing a student t-test on the data and by looking at historical data to see if the data falls within historical trends. To determine equivalency based on the T statistic, the null hypothesis, H_o, assumes that the true mean difference is zero and is tested by comparing the t statistic to the appropriate tabled t value. If $T < -t_{\alpha/2,n-1}$ or $T > t_{\alpha/2,n-1}$, where α is the level of significance and n is the degrees of freedom, then null hypothesis is rejected and it is concluded that the true mean difference is significantly different from zero. If $T > -t_{\alpha/2,n-1}$ and $T < t_{\alpha/2,n-1}$, then the null hypothesis is accepted and it is concluded that there is not enough evidence to suggest that the true mean difference is significantly different from zero. This hypothesis testing will be conducted to a confidence level, or α, of 0.05 or the probability of rejecting the null hypothesis when it is in fact true at 5%.

Six wells have been selected for long-term monitoring of the INTEC plume beyond the facility boundary in support of PSQ-3. The wells selected for long-term monitoring are USGS-57, USGS-67, USGS-112, USGS-113, USGS-85, and LF3-08. These wells were selected based on a review of the historical data for I-129. However, most of the data used to select these wells for long-term monitoring is from 1990–1991; therefore, the baseline groundwater sampling data will be used to optimize the well locations and the total number of wells for long-term monitoring.

Analytes of interest include COCs that currently exist in the SRPA at concentrations exceeding either MCLs or risk-based concentrations, as well as COCs derived from the modeling, which are predicted to potentially cause a future unacceptable risk to the SRPA. Contaminants that currently exceed MCLs or risk-based concentrations and will be included in the INTEC facility monitoring program are I-129, Sr-90, and tritium. Contaminants that are predicted by the WAG 3 RI/FS modeling to exceed MCLs or risk-based concentrations at a future date, and are included in the INTEC facility monitoring program, are plutonium and uranium isotopes, Np-237, Am-241, and mercury. Chromium, while listed as a COC, is excluded here because it is specifically related to groundwater contamination at TRA. Because Tc-99 is a contributor to the total beta-emitting radionuclide limit and is present at significant concentrations in the aquifer beneath INTEC, it is included in the list of analytes for INTEC facility monitoring. To evaluate additional radionuclides that may be present but not accounted for in the modeling, gross-alpha and gross-beta analyses will also be performed. Finally, the list of analytes will be updated through either the exclusion of some analytes or inclusion of additional analytes as analytical data are accumulated or new information regarding contaminant sources is identified. The detection limits for I-129, Sr-90, and tritium required to make the decisions needed concerning the contingent remedy are 0.1 pCi/L, 0.8 pCi/L, and 2,000 pCi/L, respectively.

Sampling and analyses will occur at the following frequency:

Year 1	Baseline and Semiannual	Tritium, Tc-99, I-129, Sr-90, plutonium isotopes, uranium isotopes (U-234, -235, and -238), Am-241, Np-237, Cs-137, gross-alpha/beta, and mercury; metals and anions in semiannual and micropurge sampling only
Years 2–7	Annual	Tritium, Tc-99, I-129, Sr-90, plutonium isotopes, uranium isotopes (U-234, -235, and -238), Am-241, Np-237, Cs-137, gross-alpha/beta, and mercury

Years 8–16	Biannual	Review and adjust as required
Years 17–100	Once every 5 years	Review and adjust as required.

Following each sampling event and prior to each CERCLA 5-year review, the new groundwater sampling results will be compared against the OU 3-13 aquifer model predictions to determine how concentrations compare to the model-predicted trends. If the new data indicate the necessity, the model will be updated, generating new COC concentration predictions. These predictions will be compared against the Group 5 RAO/RGs to determine if they will be exceeded. If the data trends exceed model-predicted trends and indicate a potential to exceed the Group 5 RAO/RGs, the sampling frequency will revert to annual sampling and progress in a manner similar to the schedule above.

2.1.2.7 State the Problem. The WAG 3 ROD requires monitoring activities to determine whether present contaminants in Group 5 or the flux of contaminants originating from within the INTEC security fence will affect the aquifer such that Idaho groundwater quality standards or risk-based concentrations will not be met in Group 5 in 2095.

2.1.3 Performance Standards (RAOs and RGs)

2.1.3.1 Remedial Action Objectives. The remedial action for Group 5, SRPA, will be evaluated against the RAOs and RGs established in the WAG 3, OU 3-13 ROD (Section 8) (DOE-ID 1999). The RAOs for OU 3-13 were developed in accordance with the S.O. NCP and CERCLA RI/FS guidance. The RAOs specify the contaminants and media of concern, potential exposure pathways, and RGs. The RGs establish acceptable exposure levels that protect human health and the environment. Factors that are considered in establishing RGs are outlined in 40 CFR 300.430(e)(2)(1). RAOs are specific risk criteria that take into consideration the assumed future land uses at INTEC. The RAOs are primarily based on the results of the baseline risk assessment and ARARs.

The INTEC land use assumptions used to develop the RAOs include industrial use prior to 2095 and potential residential use after that time. Other assumptions used to develop the RAOs, as listed in the ROD, include

- The INTEC facility will be used as an industrial facility up to the year 2095. During the period of DOE operations (expected to last to at least 2045), this area is a radiological control area. Only the contaminated groundwater present in the SRPA outside of the current INTEC security fence is addressed in the OU 3-13 ROD. The selected remedy is expected to fully address this contamination. However, this action does not address groundwater inside the INTEC security fence, which will be addressed under OU 3-14.
- For the time period 2095 and beyond, it is assumed that the SRPA located outside the current INTEC security fence will be used as a drinking water supply.
- The annual carcinogenic risk at the INTEC from natural background radiation due to surface elevation and background soil radiological contamination is 10^{-4} (EPA 1994b, NEA 1997, UNEP 1985).
- Permanent land use restrictions will be placed on those release site source areas and the ICDF Complex, which will be closed in place, for as long as land use and access restrictions are required to be protective of human health and the environment.

To achieve a reasonable degree of protection at the WAG 3 sites, the Agencies have selected a remedy for each group of sites that meet the RAOs. These remedies protect human health and the environment and meet regulatory requirements. The WAG 3 RAOs were developed for specific media (i.e., soils, perched water, or groundwater). The applicable RAOs for a particular site or group of sites depend on the specific media impacted. The RAOs, which are listed in Section 8 of the ROD (DOE-ID 1999), and are directly applicable to Group 5, include

NOTE: *RAO numbering below is same as in the ROD.*

1. Groundwater:
   a. For INTEC-impacted groundwater located in the groundwater contaminant plume outside the INTEC security fence, restore the aquifer for use by 2095 and beyond, so that the risk will not exceed a cumulative carcinogenic risk of 1×10^{-4} for groundwater ingestion
   b. For INTEC-impacted groundwater located in the groundwater contaminant plume outside the INTEC security fence, restore the aquifer to drinking water quality (below MCLs) for use in 2095 and beyond
   c. For INTEC-impacted groundwater located in the groundwater contaminant plume outside the INTEC security fence, restore the aquifer so that the noncarcinogenic risk will not exceed a total hazard index of 1 for groundwater ingestion.
2. SRPA (INTEC-derived groundwater contaminant plume outside the INTEC security fence):
   a. In 2095 and beyond, ensure that SRPA groundwater does not exceed a cumulative carcinogenic risk of 1×10^{-4}; a total hazard index of 1; or applicable State of Idaho groundwater quality standards (i.e., MCLs).

2.1.3.2 Remediation Goals. To meet the RAOs, RGs are established. These goals are quantitative cleanup levels based primarily on risk to human health and the environment. The RGs are based on the results of the baseline risk assessment and evaluation of expected exposures and risks for selected alternatives. If an ARAR is more restrictive, then the ARAR standard is used as the RG. The RGs will be used to assess the effectiveness of the selected remedial alternatives in meeting the RAOs. RAOs, discussed below, were developed in the ROD in Section 8 (DOE-ID 1999).

RGs for INTEC-derived COCs in the SRPA groundwater outside the INTEC security fence are based on the applicable State of Idaho groundwater quality standards (IDAPA 16.01.011.200). The SRPA COCs consist of H-3, Sr-90 and daughters, I-129, Np-237, chromium, and mercury until 2095, and Sr-90, I-129, Np-237, plutonium and uranium isotopes and their daughters, and mercury in 2095 and beyond. The SRPA groundwater RGs for these COCs are presented in Table 2-2.

The RG for INTEC-derived alpha-emitting radionuclides (i.e., Np-237, Pu isotopes and their daughters, Am-241, and U isotopes and their daughters) in the SRPA groundwater outside the current INTEC security fence corresponds to a cumulative alpha-activity of 15 pCi/L in the year 2095 and beyond. WAG 3 RI/FS modeling has shown that alpha-emitting radionuclides are not expected to exceed the 15 pCi/L standard in the SRPA inside the current INTEC security fence until the year 2750, with a peak concentration occurring in the year 3804. Remediation, if necessary, of the tank farm inside the current INTEC security fence is expected to mitigate the future alpha-emitting radionuclide impacts in the SRPA outside the current INTEC security fence. RGs for the alpha-emitting radionuclides in the SRPA inside the current INTEC security fence will be established in the final action developed in OU 3-14.

Table 2-2. SRPA contaminant of concern RGs.

Contaminant of Concern	SRPA RGs (Maximum Contaminant Levels) For Single COCs	Decay Type
Beta/gamma-emitting radionuclides	Total of beta/gamma-emitting radionuclides shall not exceed 4 mrem/yr effective dose equivalent	Beta/gamma
Sr-90 and daughters	8 pCi/L	Beta
Tritium	20,000 pCi/L	Beta
I-129	1 pCi/L as sole $\beta-\gamma$ emitter, all included to demonstrate compliance against 4 mrem/yr	Beta/gamma
Alpha-emitting radionuclides	15 pCi/L total alpha-emitting radionuclides	Alpha
Uranium and daughters	15 pCi/L this includes all α emitters except as specified in 40 CFR 141.16	Alpha
Np-237 and daughters	15 pCi/L this includes all α emitters except as specified in 40 CFR 141.16	Alpha
Plutonium and daughters	15 pCi/L this includes all α emitters except as specified in 40 CFR 141.16	Alpha
Am-241 and daughters	15 pCi/L this includes all α emitters except as specified in 40 CFR 141.16	Alpha
Nonradionuclides		
Chromium	100 µg/L	Not applicable
Mercury	2 µg/L	Not applicable

The RG for beta/gamma-emitting radionuclides (H-3, Sr-90 and daughters, and I-129) in SRPA groundwater outside the current INTEC security fence is restricted to a cumulative dose of 4 mrem/yr in the year 2095 and beyond. The RGs for chromium and mercury are 100 µg/L and 2 µg/L, respectively, for individual constituent MCLs.

2.1.4 Performance Measurement Points

The Group 5 RA performance will be evaluated against the Group 5 RAOs and RGs discussed above. The performance measurement point for the Group 5 RA resides in the SRPA at the boundary of the INTEC security fence where COC concentrations must not exceed either a carcinogenic risk of 1×10^{-4}, an hazard index of 1, or drinking water standards (i.e., MCLs) in the year 2095 and beyond. All wells downgradient of the INTEC boundary must similarly meet drinking water standards by 2095.

However, because the RAO establishes that the performance criteria will be met in the year 2095 and beyond, present day measurement of whether or not RAOs are achieved is not possible. Numerical model predictions based on vadose zone moisture content and COC concentrations trends in both the vadose zone and the aquifer beneath the INTEC are required to determine if the RAO will be met in 2095 and beyond. The monitoring program for vadose moisture content and COC concentrations in both the vadose zone and SRPA is established (Note: perched water and vadose zone monitoring beneath INTEC will be accomplished under the Group 4 monitoring program) to support the numerical modeling. Data obtained from the soil moisture monitoring and COC concentration sampling, as well as additional data regarding stratigraphy, lithology, and other new information, will be incorporated into the WAG 3 model to periodically update the model predictions for COC concentrations in 2095. Until the year 2095, this modeling will be utilized to predict whether the RAOs are being met.

2.1.5 Rationale for Selection of Performance Measurement Points

Performance measurement points for Group 5 are based directly on the RAOs that are presented in the OU 3-13 ROD (DOE-ID 1999). The RAOs take into consideration land use assumptions and protect human health and the environment. The primary cause for establishing the performance measurement point at the security-fence boundary of INTEC in 2095 is the land use assumption stating that the SRPA outside the INTEC security fence will be available for residential use in 2095. For this reason, water quality outside of the INTEC security fence in 2095 and beyond must meet drinking water standards.

2.1.6 Group 5 Snake River Plain Aquifer ARARs

A complete listing of the applicable Group 5 ARARs, including an explanation of how they will be met on this project, is included in Section 3.2, Detailed Evaluation of How ARARs Will Be Met.

2.1.7 Technical Factors of Importance in Design and Construction

Drilling Through Perched Water **—**The construction of monitoring wells south of INTEC may involve drilling through zones of perched water. Well construction design for these wells must account for the potential difficulties in encountering saturated zones above the water table, primarily in the form of flowing sediments or large volumes of water draining down the well as drilling proceeds through and below the saturated zones. For this reason, it will be necessary to seal these saturated zones from the borehole. This will generally be performed through grouting and casing the unstable zone, reducing the drill bit size, and continuing drilling to the target depth.

3. DESIGN BASIS

3.1 Status of Record of Decision Assumptions

The bounding assumptions under which the Group 5 RD/RA activities will be performed include the assumptions presented below. These assumptions describe the limiting factors and conditions under which the RD/RA activities will be performed. The general assumptions relative to OU 3-13 Group 5 include the following:

- Monitoring for each group will be performed as part of RD/RA and is separate from institutional controls.
- A minimum institutional control period to the year 2095 for land use or access restrictions required to be protective will be implemented at all sites where contaminant concentrations exceeding allowable risk ranges are left in place. The continued need for land use or access restrictions will be evaluated by the Agencies during each 5-year review.
- Institutional controls until 2095 will consist of site access controls, radiological posting controls, and land use controls as shown in Table 11-1 of the ROD (DOE-ID 1999).
- The overall RAO for OU 3-13 is to achieve an hazard index of 1.0 or less and a cumulative increased carcinogenic risk of less than 1×10^{-4}.

In addition to the general assumptions applicable to all groups, the specific assumptions for Group 5, SRPA, include the following:

- Institutional controls over the area of the aquifer exceeding the MCLs for H-3, I-129, and Sr-90 will be protective by restricting future groundwater use through use of deed restrictions and regulatory restrictions on drilling, construction, and placement of groundwater wells. Notice of these restrictions will be given to local county governments, such as Sho-Ban Tribal Council, GSA, and BLM.
- COCs will meet the groundwater quality standards by the year 2095, based on computer-modeled predictions.
- If the action level of 11.4 pCi/L for I-129 is exceeded in selected monitoring wells at a sustainable pump rate of 0.5 gpm for a period of 24 hours (south of the INTEC security fence), then the contingent remediation pump and treat will be implemented.
- Monitoring of the SRPA for Idaho water quality parameters and federal MCLs will be used to evaluate effectiveness of the remedies with specified RGs of protecting the SRPA.
- Implementation of the contingent remedy depends upon the results of the groundwater monitoring.
- If groundwater treatment is implemented, the treated water will be returned to the aquifer by land recharge in accordance with Idaho Wastewater Land Application ARARs if a recharge impoundment is used, by discharge to the Big Lost River in accordance with NPDES/State Pollutant Discharge Elimination System (SPDES) ARARs, or by evaporation in the ICDF Complex evaporation pond or equivalent.
- Long-term monitoring will be required until RAOs are achieved.

3.2 Detailed Evaluation of How ARARs Will Be Met

Table 3-1 contains a list of the ARARs identified in the ROD for Group 5, along with the specific action(s) that will be taken to ensure the ARARs are met.

3.3 Detailed Justification of Design Assumptions

Modeling of the SRPA for the WAG-3 OU 3-13 RI/BRA (DOE-ID 1997a) predicted a future risk to groundwater users due to high concentrations of I-129 and Sr-90 predicted in the low-hydraulic conductivity HI sedimentary interbed beyond the year 2095. However, only a limited amount of empirical data are available to confirm the physical properties of the HI interbed as assumed in the OU 3-13 RI/BRA model and there is no data regarding the presence or absence of contaminants in the interbed. Empirical evidence of the HI interbed contamination and permeability is required to verify the model predictions and refine the model parameterization in the event that observed concentrations exceed the action levels defined in the WAG-3 ROD.

Sensitivity of the model parameterization was performed to identify key data needs and support field activities to collect empirical data. A refined and recalibrated model will then be used to determine if contamination within the HI interbed still presents a risk to groundwater users in the event that observed concentrations exceed action levels. Iodine-129 was chosen as the indicator contaminant for model sensitivity because it is long-lived and was predicted to present the greatest contaminant risk within the interbed. The tasks performed to assess model sensitivity are (1) review of the OU 3-13 RI/BRA model, (2) review of the I-129 source term in the model, (3) sensitivity analysis of HI interbed hydraulic conductivity, and (4) sensitivity analysis of HI interbed thickness and discretization. A more detailed discussion of the RI/BRA modeling and sensitivity of model parameterization is included in Appendix C.

3.3.1 Review of the WAG-3 OU 3-13 RI/BRA Aquifer Model

The physical and hydrogeologic setting of the INTEC is highly complex, consisting of layers of basalt and sediments. In the vadose zone, the sedimentary interbeds are often saturated, forming perched water zones due to large water sources at the INTEC surface. The geology of the aquifer region is more uniform in the vertical direction than the geology of the vadose zone. The basalt structures tended to be thicker, and the sedimentary interbeds were fewer in number. USGS studies (Anderson and Lewis 1991) indicate that the aquifer in the region north of the INTEC and extending south of the RWMC is comprised primarily of the H basalt flow, the HI interbed, and the lower I basalt flow. The I basalt flow is significantly thicker and has a lower permeability than the H basalt flow (Anderson and Lewis 1991). The HI interbed separates the two basalt flows. Two separate models were used to represent the vadose zone and the aquifer beneath the INTEC. The basis and simulation results for the aquifer model are briefly discussed here.

The aquifer model used four distinct stratigraphic types. These include an upper I basalt unit, a lower I basalt unit, the HI interbed, and the H basalt unit. The upper I basalt structure was assigned permeabilities representative of those obtained from aquifer testing the INTEC pumping and injection wells. The lower I basalt and H basalt structure was assigned regional permeabilities taken from the WAG-10 modeling effort (McCarthy et. al. 1994). The H basalt structure in the vicinity of the vadose zone footprint was assigned local INTEC permeabilities from the pumping tests.

Table 3-1. Compliance with ARARs for Group 5, Snake River Plain Aquifer interim action selected remedy.

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate, or TBC[a]	Comments
Group 5—Snake River Plain Aquifer: Alternative 2B—Institutional Controls with Monitoring and Contingent Remediation			
Action-Specific			
IDAPA 37.03.09.025	Idaho well construction standards	Applicable	Applies to SRPA monitoring.
IDAPA 58.01.05.008 (40 CFR 264.114)	Disposal or decontamination of equipment, structures, and soils	Applicable	Applies to drilling, sampling, and treatment equipment that contacts SRPA groundwater.
IDAPA 58.01.01.585, 58.01.01.586	Rules for the control of air pollution in Idaho	Applicable	Will be met by treatment system.
IDAPA 58.01.01.650, 58.01.01.651	Idaho fugitive dust emissions	Applicable	Will be met for contaminated drill cuttings.
40 CFR 61.92, 61.93	NESHAP for radionuclides from DOE facilities, emission monitoring and emission compliance	Applicable	Will be met using engineering and administrative controls.
40 CFR 125	NPDES		Applies if contingent remediation is implemented and treated groundwater is discharged to the Big Lost River.
10 CFR 20, Appendix B	Annual limits for effluent concentrations	Applicable	Applies if treated water is discharged.
40 CFR 122.26	Storm water discharges during construction	Applicable	Substantive requirements will be met.
IDAPA 58.01.05.008 (40 CFR 264.601)	Treatment standards for miscellaneous units	Applicable	Specific requirements will be clarified and met in 10% design.
IDAPA 58.01.17.300	Wastewater land application permit requirements	Applicable	Applies if treated wastewater is discharged to a percolation pond; substantive requirements will be met.
IDAPA 58.01.02.400	Rules governing point source discharge	Applicable	Applies if treated wastewater is discharged to the Big Lost River.
IDAPA 58.01.02.401	Point source wastewater treatment requirements	Applicable	Applies if treated wastewater is discharged to the Big Lost River.
Chemical-specific			
IDAPA 58.01.05.006 (40 CFR 262.11)	Hazardous waste determination	Applicable	Applicable to groundwater that will be stored long-term or treated.

Table 3–1. (continued).

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate, or TBC[a]	Comments
IDAPA 58.01.11.200(a) (40 CFR 141) for:	Groundwater quality standards (primary drinking water standards)	Applicable	This ARAR will be met in the restoration timeframe (2095) in the SRPA contaminant plume outside of the current INTEC security fence. Any recharge to the SRPA will be limited to concentrations so that this ARAR will be met in 2095.
Gross alpha particle activity (including radium-226, but excluding radon and uranium)			
Combined beta/photon emitters			
Combined radium-226 and radium-228			
Strontium-90			
Tritium			
Location-specific			
None identified			
TBCs			
DOE Order 435.1	Radioactive waste management performance objectives to protect workers	TBC	Substantive requirements will be met to protect workers.
DOE Order 5400.5	Exposures to the public will be kept ALARA	TBC	Substantive ALARA requirements will be met to protect the public.

a. TBC = to be considered

To be consistent with the sediment properties used in the vadose zone model, a permeability of 4 mDarcy and a porosity of 0.487 were assigned to the HI interbed, which overlies the I basalt flow. Assigning sediment properties uniformly over the I flow assumed that the HI interbed is 7.6 m (25 ft) thick and exists everywhere the I basalt flow exists. The porosity for the aquifer model basalt was 0.06. This value was derived from calibration of the model to H-3 disposal records and the corresponding H-3 sampling results from wells in the vicinity of INTEC.

Aquifer Model Calibration for OU 3-13 RI/BRA

The OU 3-13 RI/BRA aquifer flow model relied on the WAG-10 model calibration (McCarthy et. al. 1994) and the hydraulic parameters were not adjusted in the transport calibration process. Calibration of the transport model used the H-3 disposal history in the CPP-03 injection well. The H-3 disposed in CPP-03 provided good calibration data because H-3 is nonsorbing, and because mass disposal history from 1953-1984 along with time histories at wells downgradient are available.

Review of I-129 Source Term

The historical I-129 source term at the INTEC is described in Chapters 5 and 6 of Appendix F of the WAG-3 OU 3-13 RI/BRA report (DOE-ID 1997a). For the RI/BRA study, the INTEC releases were defined as one of three types: (1) known releases, (2) service waste releases, or (3) soil contamination releases. The following contaminant sources were evaluated in the OU 3-13 study:

- The I-129 source from the tank farm releases, based on estimates of the liquid release volumes and the I-129 concentrations in the liquid released. The I-129 contribution from the tank farm is 0.007 Ci, which is 0.5% of the total.

- The I-129 source from the injection well is 1.39 Ci, which is significantly larger than the other sources, accounting for 91.5% of the total I-129 source to the aquifer. The injection well source term was estimated from data in the Radioactive Waste Management Information System database.

- The I-129 source from the Service Waste Ponds (SWP) is 0.08 Ci, which is approximately 5.4% of the total I-129 source to the aquifer.

- The I-129 source from the soil contamination was calculated to be 0.04 Ci, which is approximately 2.5% of the total I-129 source to the aquifer.

Review of OU 3-13 RI/BRA I-129 Simulation Results

The OU 3-13 RI/BRA modeling predicted that a relatively large area of the SRPA will have I-129 concentrations greater than the 1 pCi/L MCL at the year 2095. Two areas of the HI interbed contained I-129 at concentrations above the MCL. The first area is immediately southwest of the INTEC and has a peak concentration of 3.0 pCi/L. The second area is west of Lincoln Boulevard and north of State Highway 20 and has a peak concentration of 1.4 pCi/L. These values are different from those presented in Appendix F of the OU 3-13 RI/BRA because of a coding error in TETRAD version 12.2. The RI/BRA I-129 simulation was rerun with TETRAD version 12.7.

3.3.2 Aquifer Model Sensitivity

Model Discretization Sensitivity

The OU 3-13 aquifer model has been rediscretized to estimate the model sensitivity to a single-layer HI interbed vs. a multiple-layer interbed with bottom surface below the HI interbed. The RI/BRA model treats the vertical component of the HI interbed as a single numerical grid block of constant (7.6 m [25 ft]) thickness. This one grid block discretization averages concentrations throughout the entire depth of the interbed and does not allow a vertical concentration gradient to exist in the interbed. This effect may allow an artificially large amount of mass to enter and remain in the interbed.

The OU 3-13 aquifer model also used a uniform 76-m total thickness, which did not extend below the HI interbed. Placement of the OU 3-13 model's bottom surface above the HI interbed's lowest point presents potential for erroneous low or high velocity areas due to extreme confining conditions. The rediscretized model's bottom surface was created from active aquifer thickness estimates, which were below the HI interbed.

The rediscretized model predicts the peak aquifer I-129 concentration will be 0.62 pCi/L in the year 2095. This is in contrast to the OU 3-13 RI/BRA model, which predicted the peak concentration would be 3.0 pCi/L in the year 2095 and a large area of the HI interbed south of the INTEC would remain above the 1.0 pCi/L beyond 2095. This is primarily due to the rediscretization of the HI interbed and placing the model bottom below the HI interbed. Iodine-129 still persists in the rediscretized model's HI interbed, but to a lesser extent of that in the RI/BRA model. In both models, the I-129 takes a relatively long time to enter and exit the interbed compared to basalt. This is because of the low permeability (4 mD compared to approximately 1×10^5 mD) and high porosity (0.487 vs. 0.0625) of the interbed compared to basalt. In the RI/BRA, model I-129 persists longer within and above the HI interbed because of low velocity areas created by the different HI interbed placement. It is important to note that the rediscretized model has not been calibrated to tritium disposal and breakthrough, as the RI/BRA model was. The I-129 plumes in both models are comparable. However, the axis of the rediscretized model's plume has shifted slightly westward.

Model HI Interbed Permeability Sensitivity

The low permeability of the HI interbed is primarily responsible for maintaining elevated I-129 concentrations in the simulated SRPA. There is very little data available on the permeability of the HI interbed. The OU 3-13 RI/BRA aquifer modeling used an interbed permeability (4 mD) from the vadose zone model calibration to perched water bodies beneath the INTEC. There is little confidence that vadose zone calibration adequately represents the HI interbed permeability within the aquifer. HI interbed pumping tests performed by the State of Idaho (Fredrick and Johnson 1996) provide the only hydraulic conductivity information available specifically for the HI interbed. Analysis of the pumping test data suggests the permeability range is 37 mD to 100 mD. Therefore, the 4 mD used for the WAG 3-13 modeling is at least an order of magnitude low. Information on the INTEC vadose zone interbed permeability ranges from 0.05 mD to 3,500 mD. An average permeability of 40 mD is on the low end of the most appropriate permeability value. The 4 mD used in the RI/BRA modeling represents a low bounding value and 200 mD represents a high bounding value.

HI interbed permeability in the RI/BRA and rediscretized models was varied from 4 to 200 mD and peak concentrations and the size of the I-129 plume in 2095 were compared. The area of the remaining plume in 2095 is very sensitive to permeability and monotonically decreases in size with increasing permeability for both models. The RI/BRA model area of the 0.1 pCi/L plume decreased from 70.6 to 45.4 km^2 for the 4 and 200mD interbed permeability, respectively. The rediscretized model 0.1 pCi/L area decreased from 26.4 to 10.2 km^2 for the 4 and 200 mD simulations. The peak concentrations in the year 2095 did not monotonically decrease with increasing permeability. The RI/BRA model's peak values ranged from 2.1 pCi/L for the 8 mD permeability to 3.4 pCi/L for the 40 mD permeability simulation. The rediscretized model's peak values ranged from 0.25 pCi/L for the 40 mD simulation to 4.1 pCi/L (limited to one gridblock aerial extent) for the 8 mD simulation. The varied peak concentrations in 2095 for the different interbed permeabilities indicate flow field substantially changes with different interbed permeabilities, which results in different areas retaining high I-129 concentrations.

3.3.3 Modeling Data Needs

Contaminant concentration data in the aquifer basalt and HI interbed are needed to verify whether modeling is correctly simulating the interaction of basalt and interbed, and accurately represents the SRPA. At this time, elevated I-129 and other contaminant concentrations in the interbed are hypothetical, based on modeling. Answering this data need can best be accomplished by gathering a vertical profile of aquifer concentrations above, within, and below the HI interbed at several locations. The area immediately south of the INTEC percolation ponds and the area near the Central Facilities Area are of particular interest because these areas are predicted to have elevated HI interbed I-129 concentrations now and retain concentrations near the 1 pCi/L MCL in the year 2095.

The aerial extent of contamination in the year 2095 was very sensitive to permeability in both the rediscretized and RI/BRA models. This indicates that interbed permeability on a field scale at several locations is needed to verify the RI/BRA model's homogeneous 4 mD HI interbed permeability. HI interbed permeability investigations should not be limited to evaluation of retrieved cores because hydrological properties of INEEL core rarely represent INEEL conditions on a field scale. The most useful HI interbed permeability measurements would be obtained from a straddle packer type pumping test of the in situ HI interbed.

Additional interbed elevation and thickness data are also needed. However, it may not be practical or feasible to gather enough data to adequately describe the HI interbed elevation and thickness with statistical confidence because of the variability of the data and the large area of interest.

3.3.4 Modeling Path Forward

The discretization and the HI interbed permeability sensitivity analyses suggest the RI/BRA model was conservative in predicting persistent high I-129 concentrations in the HI interbed. Review of HI interbed permeability data indicates the simulated value should be 40 mD, and the permeability sensitivity analysis indicate areal extent of contamination in the year 2095 decreases with increasing permeability. However, before predictive simulations can be performed using the rediscretized model, the model must be calibrated to aquifer head and aquifer transport data. Both the OU 3-13 RI/BRA and the rediscretized flow models relied on the WAG-10 (McCarthy et. al. 1994) flow model calibration. A multitude of new wells have been drilled since the WAG-10 modeling, and the recent work by Smith (2000)[a] has provided an improved understanding of groundwater flow direction and active aquifer thickness in the vicinity of the INEEL. A comprehensive well head data set and the flow path work by Smith (2000)[a] should be incorporated into a flow model calibration effort. The CPP-03 injection well tritium disposal data still provide a good calibration data set and should be used along with the data gathered from the OU 3-13 Group 5 field investigation to recalibrate the updated flow and transport model.

a. Dr. Richard P. Smith, BBWI Geosciences Research (Department 4122), Technical presentation, INEEL, June 8, 2000.

The recalibrated flow and transport model should then be used to reassess I-129 risk before any remediation work begins or remediation strategies are developed.

3.4 Plans for Minimizing Environmental and Public Impacts

One of the general purposes of the FFA/CO is to "expedite the cleanup process to the maximum extent practicable consistent with protection of human health and the environment" (DOE-ID 1991). The parties to the FFA/CO intended that any response action selected, implemented, and completed under the agreement will be protective of human health and the environment such that remediation of releases covered by the agreement shall obviate the need for further response action.

Every effort has been made in the planning of this project to utilize well-established and available processes and guidance, and achieve compliance with CERCLA and Resource Conservation and Recovery Act (RCRA) processes. Special consideration has been given to the disposition of dangerous or emergency conditions.

If a dangerous/emergency condition is discovered that may pose "imminent and substantial endangerment to people or the environment," DOE-ID, EPA, or IDHW have the authority to stop work per FFA/CO, Section 29.

4. REMEDIAL DESIGN

This section outlines the activities that will be taken to meet the remedial action objectives and RGs that have been set forth in the ROD.

4.1 Plume Evaluation FSP Activities

This project is aimed at determining the actions required to meet the goal of "in 2095 and beyond, ensure that SRPA groundwater does not exceed a cumulative carcinogenic risk of 1×10^{-4}, a total hazard index of 1, or applicable State of Idaho groundwater quality standards" (DOE-ID 1999). The plume evaluation will be carried out as a three-step process providing data to support decisions required for the contingent remedy design. Appendix A, Plume Evaluation Field Sampling Plan, details these activities.

Geophysical and chemical data will first be collected from the HI interbed through the deepening of four previously existing wells and the installation of one new well south of the INTEC. Aquifer water will then be collected and analyzed to determine whether these COC maximum concentration action levels are exceeded within portions of the aquifer.

If contaminant levels exceed the model-generated action levels, those zones exceeding the levels will be pump-tested for a period of 24 hours to determine whether they will sustain a flow rate of 0.5 gpm or higher.

If zones having COC levels above the action level yield a sustained flow rate of greater than 0.5 gpm, modeling will be conducted to determine the volume of the contamination plume exceeding the action level.

4.1.1 Drawings and Specifications

This section outlines the specifications for the collection of data required to address the remedial action DQOs. Drawings of the proposed well locations for interbed and aquifer water sampling are also shown.

4.1.1.1 Specifications. Four new monitoring wells/boreholes will be installed by coring through the HI interbed to the first zone of high permeability in the I basalt below the HI interbed, but not to exceed 30 m (100 ft) below the interbed base (Figure 4-1).

The HI interbed is a sedimentary unit located stratigraphically between the H and I basalt flow groups. The interbed is approximately 168 m (550 ft) below land surface at INTEC and generally slopes to the southeast. The average thickness of the unit within the study area is approximately 6 m (20 ft), but thickness ranges from 0 to 18 m (0 to 60 ft) have been observed in nearby wells.

Samples will be collected from interbed materials for chemical analysis of the COCs and for physical and geotechnical analysis. It is anticipated that three sample groups will be collected at each well location: one set of all chemical and geophysical parameters samples from the top; one from the middle of the HI interbed, and one from the bottom of the HI interbed. If zones that have unique hydrogeologic characteristics are encountered in the HI interbed, additional samples will be taken from the HI interbed, if possible.

The new wells and three existing wells will undergo geophysical and fluid logging in order to determine appropriate straddle packer zones for water sampling. Approximately 10 zones will be selected above, within, and below the HI interbed in each of the aquifer monitoring wells. Water sampling will then be conducted on the selected zones and the samples will be analyzed for identified COCs.

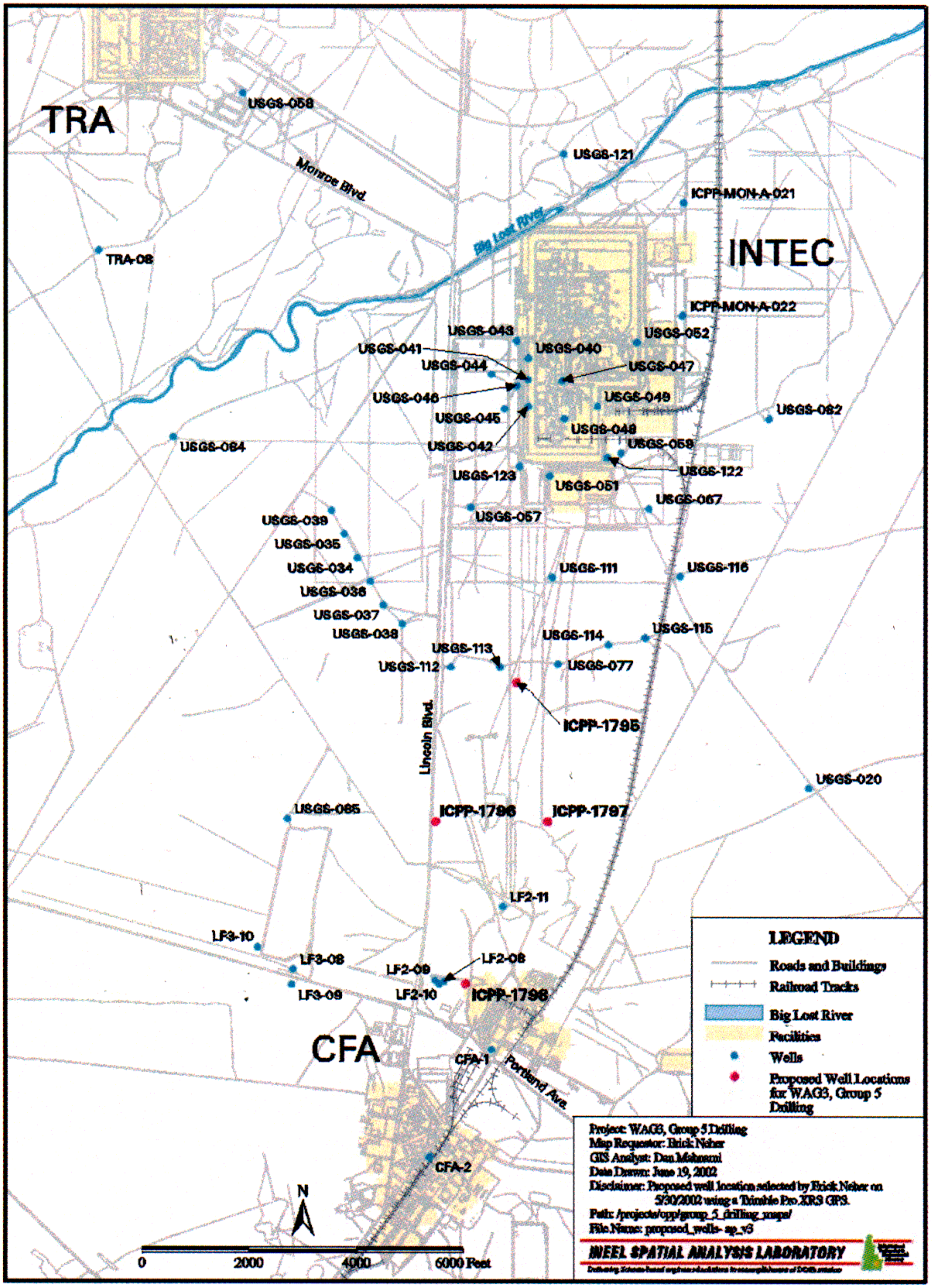


Figure 4-1. Location of monitoring wells to be deepened to sample HI interbed and location of the new well.

At locations USGS-57, USGS-112, and USGS-113, a total of four groundwater samples will be collected and analyzed for Tc-99 and I-129 from the HI interbed zone during the vertical profile sampling. At the new monitoring wells/boreholes, a sample and one replicate sample will be collected from the HI interbed. The I-129 sample, Tc-99 sample, and Tc-99 replicate will be analyzed. The replicate I-129 samples will be analyzed if the Tc-99 replicate samples show significant statistical variability or the I-129 is above the action level.

The statistical evaluation of the Tc-99 replicates will follow data validation guidelines in TPR-80 for duplicate samples. The mean difference will be calculated and, if it is less than or equal to 3, then the results are considered acceptable. The mean difference is calculated from:

$$MD = \frac{|S - D|}{\sqrt{(\sigma_s^2 + \sigma_D^2)}}$$

Where

MD= the mean difference of the duplicate results

S = the original sample result (as pCi/g or pCi/L).

D = the duplicate sample result (as pCi/g or pCi/L).

σ_s = the associated total propagated 1σ uncertainty of the original result (as standard deviation).

σ_D = the associated total propagated 1σ uncertainty of the duplicate result (as a standard deviation).

A MD value of approximately 3 indicates that the results agree at the 3σ confidence interval and an MD value of 1 indicates that the results agree at the 1σ confidence interval. If the MD >3, the relative percent difference (RPD) will be calculated and, if the result is less than 20%, then the samples will be considered to be in agreement. The RPD is defined as:

$$\text{RPD} = \frac{\text{high result} - \text{low result}}{\text{average result}} \text{ X } 100 .$$

If any zones exceed the model-generated action levels, they will be isolated with a straddle packer assembly and pump-tested for a 24-hour period at a discharge rate of 0.5 gpm. Discharge water samples will be collected during the pump test at 4-hour intervals and analyzed for identified COCs.

Modeling will be conducted to determine the volume of any zones that exceed the COC action level and are capable of producing a sustained yield of 0.5 gpm over a 24-hour period.

4.1.1.2 Drawings and Schematics. This section shows proposed sampling well locations, construction, and the types of samples for data acquisition.

Well Locations—Four new monitoring wells/boreholes will be constructed to sample the HI interbed. Water samples will be collected from these wells/boreholes in addition to three other existing wells. Using other preexisting monitoring wells will assist in determining the lateral extent of the aquifer COC concentrations. These wells are shown in Figure 4-1.

Well Construction/Instrument Diagrams—Existing wells and new wells/boreholes will be used for packer sampling. (Figure 4-2 is a conceptual diagram for straddle-packer sampling.)

Chemical and Geotechnical Data—The type and number of individual samples to be collected from each well are listed in Table 4-1. The actual number collected may vary based on field conditions that are encountered.

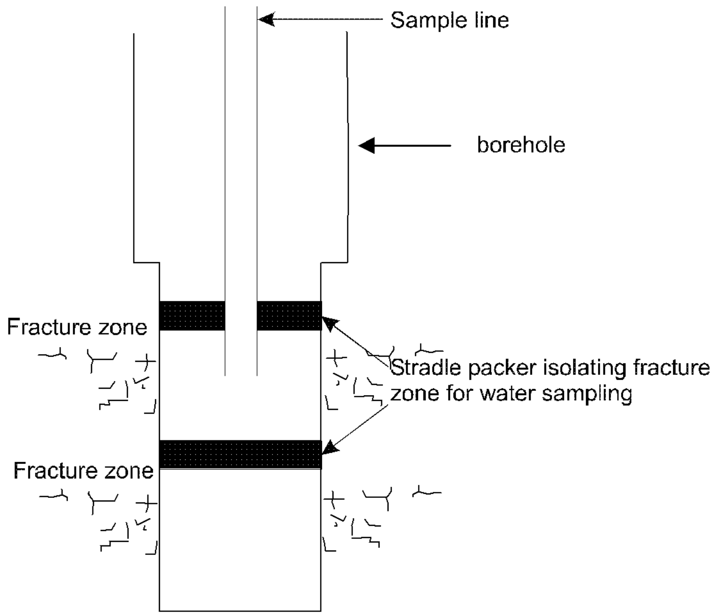


Figure 4-2. Conceptual diagram for straddle-packer sampling.

Table 4-1. Type and number of samples collected.

Analysis	Matrix	USGS 38*	USGS 57*	USGS 67*	ICPP-1795	ICPP-1796	ICPP-1797	ICPP-1798
H-3	Water	10	10	10	10	10	10	10
Sr-90	Water	10	10	10	10	10	10	10
I-129 (standard detection level)	Water	10	10	10	10	10	10	10
I-129 (low detection level)	Water	3	3	3	3	3	3	3
H-3	Interbed	0	0	0	3	3	3	3
Sr-90	Interbed	0	0	0	3	3	3	3
I-129	Interbed	0	0	0	3	3	3	3
Grain size	Interbed	0	0	0	3	3	3	3
Porosity	Interbed	0	0	0	3	3	3	3
Bulk density	Interbed	0	0	0	3	3	3	3
Hydraulic conductivity	Interbed	0	0	0	3	3	3	3

* Anticipated well locations; actual locations may vary due to field conditions

4.2 Long-Term Monitoring Activities

The long-term monitoring activities for WAG 3, OU 3-13, Group 5 will consist of groundwater-level monitoring and groundwater sampling. This will be performed as described in Appendix B, Long-Term Monitoring Plan, to determine if the COC flux entering the SRPA from inside the INTEC security fence and the COC concentrations downgradient of the INTEC facility will cause the groundwater to exceed Idaho water quality standards in the year 2095.

4.2.1 Drawings and Specifications

This section outlines the specifications for the information that will be used to show whether the RAOs have been meet.

4.2.1.1 Specifications. This section covers the methods and materials that will be used in the successful completion of the long-term monitoring activities. Three tasks will be used to determine if the RAO objectives will be met: (1) groundwater sampling, (2) water level monitoring, and (3) comparison of field data with, and updating the predictions of, the aquifer numerical model.

Groundwater samples will be collected from 47 wells in the INTEC area to provide a baseline of the present state of COC concentration in the aquifer. Following the baseline sampling, long-term monitoring will continue using 20 wells. The long-term monitoring wells include 11 wells within or near the INTEC security fence, three wells to monitor below the HI interbed near the injection well and six wells in the plume downgradient of INTEC, depending on the results, for a period that may be as long as the institutional control period. Tables 4-2 and 4-3 list the wells to be used for the baseline and follow-on groundwater monitoring.

Table 4-2. Baseline groundwater sampling wells.

INEEL Name			
ICPP-MON-A-021	USGS-34	USGS-46	USGS-85
ICPP-MON-A-022	USGS-35	USGS-47	USGS-111
LF2-08	USGS-36	USGS-48	USGS-112
LF2-09	USGS-37	USGS-49	USGS-113
LF2-10	USGS-38	USGS-51	USGS-114
LF2-11	USGS-39	USGS-52	USGS-115
LF2-12	USGS-40	USGS-57	USGS-116
LF3-08	USGS-41	USGS-59	USGS-121
LF3-09	USGS-42	USGS-67	USGS-122
LF3-10	USGS-43	USGS-77	USGS-123
LF3-11	USGS-44	USGS-82	MW-18
USGS-20	USGS-45	USGS-84	

Table 4-3. Long-term groundwater monitoring wells.

INEEL Name		
USGS-40	USGS-52	USGS-57
USGS-41 (sampled below HI interbed)	USGS-59 (sampled below HI interbed)	USGS-67
USGS-42	USGS-121	USGS-85
USGS-47	USGS-122	USGS-112
USGS-48	USGS-123	LF3-08
USGS-48 (sampled below HI interbed)	MW-18	
USGS-49	USGS-113	
USGS-51		

Groundwater elevation monitoring will be performed on a monthly basis for 1 year, followed by quarterly measurements during the second year, semiannually for 2 years, and annually thereafter until it is determined that the RAOs have been met. Table 4-4 lists the wells to be used for the groundwater elevation monitoring.

Table 4-4. Wells for water-level monitoring.

INEEL Name				
ICPP-MON-A-021	LF3-11	USGS-42	USGS-57	USGS-112
ICPP-MON-A-022	USGS-20	USGS-43	USGS-59	USGS-113
LF2-08	USGS-34	USGS-44	USGS-65	USGS-114
LF2-09	USGS-35	USGS-45	USGS-67	USGS-115
LF2-10	USGS-36	USGS-46	USGS-76	USGS-116
LF2-11	USGS-37	USGS-47	USGS-77	USGS-121
LF2-12	USGS-38	USGS-48	USGS-82	USGS-122
LF3-08	USGS-39	USGS-49	USGS-84	USGS-123
LF3-09	USGS-40	USGS-51	USGS-85	MW-18
LF3-10	USGS-41	USGS-52	USGS-111	TRA-08

Approximately 20 wells will be sampled by the micropurge method during the semiannual sampling event. The micropurge pumps will be placed at the same depth as the pumps that are currently in the wells. The current pump depths were evaluated by the USGS and the depth selection was based on borehole fluid and geophysical logging. The pumps were placed in zones of high transmissivity. The goals of the micropurge sampling are to get data that is comparable to historical data collected from the wells and to reduce the amount of purge water generated during sampling.

4.2.1.2 Drawings. Maps showing the well locations for the long-term monitoring are included below. Figure 4-3 shows the locations for the baseline groundwater monitoring wells, and locations of the monitoring wells to be used for groundwater elevation monitoring Figures 4-4 and 4-5 show the well locations for the long-term monitoring.

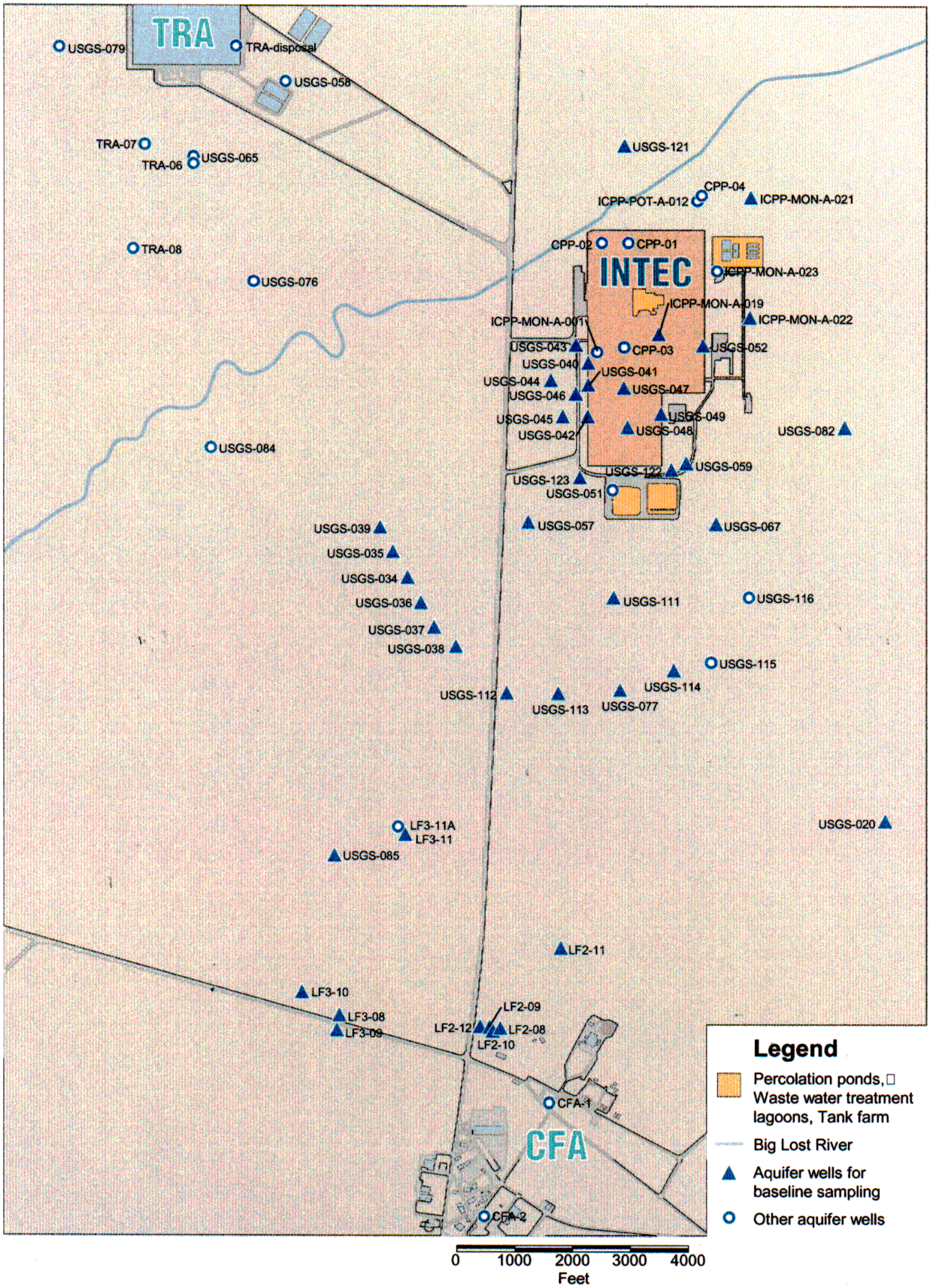


Figure 4-3. INTEC groundwater wells for baseline sampling and water-level measurement.

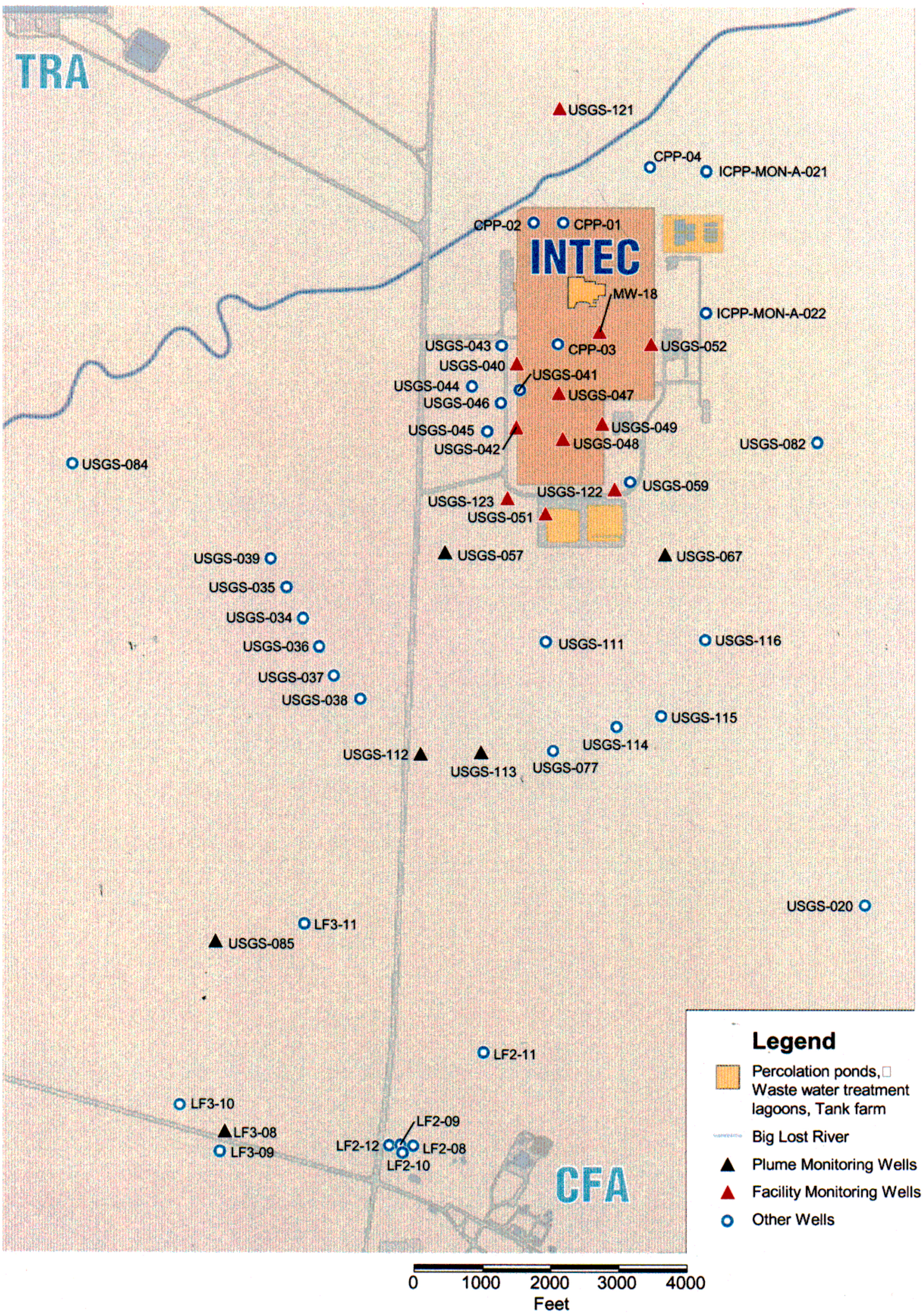


Figure 4-4. INTEC groundwater wells for long-term monitoring.

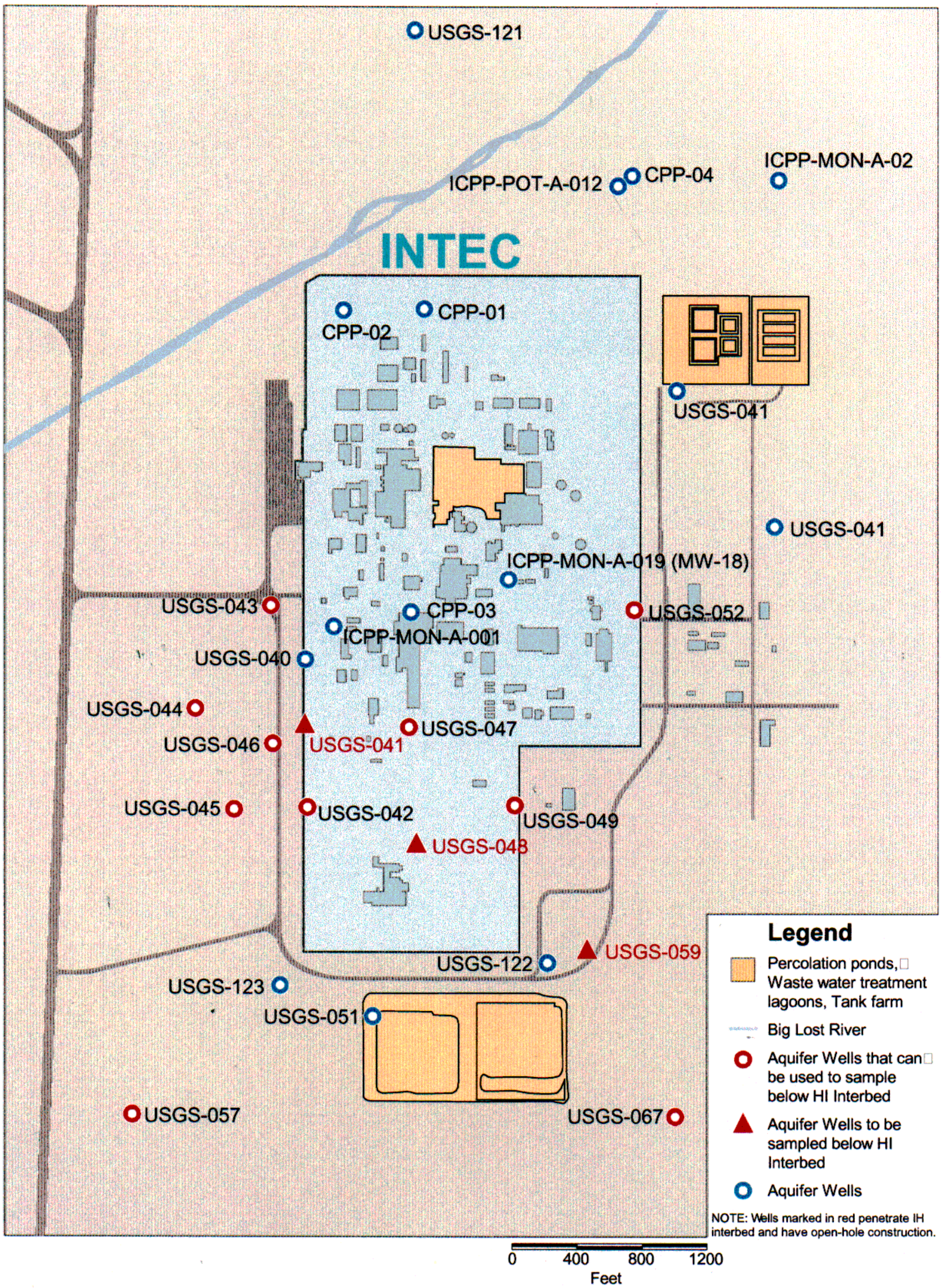


Figure 4-5. INTEC groundwater wells for long-term monitoring of the COC flux from the former injection well below HI interbed.

5. REMEDIAL ACTION WORK PLAN

5.1 Relevant Changes to the RD/RA SOW

The RD/RA SOW for WAG 3, OU 3-13 (DOE-ID 2000a) presents a SOW for Group 5 that consists of

- Reevaluation of the SRPA model in order to identify the potential hot spot(s) for the COCs
- The drilling of four new wells/boreholes within the areas of the identified COC concentration
- The sampling and analysis of water samples from those wells
- Depending upon the results of the sampling, conducting 24-hour-pump tests on the wells where the COCs exceed proscribed action levels
- If the pump test(s) indicates that well production is equal to or greater than 0.5 gpm during the 24-hour test period, treatability studies will be performed.

Based on the modeling evaluation, the new wells/boreholes will be constructed to the HI interbed.

5.2 Subcontracting Plan

The work elements comprising this RA consist primarily of well drilling and the monitoring, sampling, and analysis of the wells.

The major portion of this work is planned to be competitively bid and awarded to the lowest qualified bidder. The BBWI procurement process will be followed and will include, but is not limited to, issuance of a Request for Proposal (RFP), prebid conference, bid evaluation, notice of award, notice to proceed, vendor data submittals, and preconstruction kick-off meeting.

The work elements described in this work plan may be performed under a single subcontract or several subcontracts. Site force personnel may perform a portion of this work, if necessary. Both subcontract and site personnel will be required to perform to the schedule outlined in Section 5.7 of this document in order to meet the overall project schedule and objectives.

5.3 Remedial Action Work Elements

This section provides an overview of the 10 major elements of the remedial action work plan.

5.3.1 Premobilization

Premobilization efforts involve all work elements that must be completed before the drilling contractor arrives on the site to start work. This includes such work as securing a contract for drilling services, surveying proposed locations, marking proposed locations for underground utilities, and completion and approval of work control packages. The final premobilization effort is a formal pre-job meeting at which the scope of work is discussed and Health and Safety Plan (HASP) training is conducted. Any outstanding questions about the work to be performed are resolved at this meeting.

5.3.2 Mobilization

Once the pre-job meeting has been completed, the drilling contractor will be free to begin mobilization of the equipment to the site. Mobilization of equipment consists of physically locating all drilling and ancillary equipment to the site and setting up on the first hole to be drilled.

5.3.3 HI Interbed Hot Spot Drilling

The BBWI procurement process will be followed and will include, but may not be limited to, the issuance of an RFP, prebid conference, bid evaluation, notice of award, notice to proceed, vendor data submittals, and preconstruction kick-off meeting.

A trained geologist, supported by the area construction engineer, will observe the well drilling activities to log the borehole and well construction and ensure that the work meets the contract requirements.

Other work elements included in this task, such as nondrilling fieldwork, may be performed by BBWI personnel or performed under other subcontracts.

5.3.4 Vertical Sampling

Borehole geophysical and fluid logging will be performed by BBWI or USGS personnel.

Collection of interbed materials and aquifer water samples will be conducted by INEEL personnel. A subcontract laboratory will perform analysis of the samples. Coordination of the laboratory contracting and data management (as shown in Appendix D, Data Management Plan) will be performed by the INEEL Sample Management Organization (SMO).

5.3.5 24-Hour Pumping and Sampling

If needed, any 24-hour-pumping tests and any other sampling or work elements included in this task, may be performed by BBWI personnel or performed under other subcontracts. A subcontract laboratory will perform analysis of the samples collected during the pump test. Coordination of the laboratory contracting and data management will be performed by the INEEL SMO.

5.3.6 Demobilization

When all drilling has been completed and instrumentation has been placed, the contractor will begin demobilization of the equipment. Demobilization includes the physical removal of all equipment from the site, restoration of disturbed areas, and general cleanup of all work areas. When demobilization is completed, the work areas should be as close to original condition as possible.

5.3.7 Baseline Sampling

Forty-seven existing INTEC aquifer wells will be sampled by INEEL personnel at the onset of the Group 5 monitoring. The choice of a laboratory to perform the sample analysis has yet to be made. Coordination of the laboratory contracting and data management will be performed by the INEEL SMO.

5.3.8 Micropurge Sampling

During the semiannual groundwater sampling event, groundwater samples will be collected using both the high flow (15 – 25 gpm) pumps currently in the wells and using a micropurge method that pumps approximately 1 gpm at approximately 20 wells. The data from both methods will be evaluated to determine if the data sets are statistically equivalent. If the micropurge data are determined to be equivalent to the standard method data, subsequent groundwater samples will be collected by the micropurge method. Adopting the mircopurge method will substantially reduce the amount of wastewater generated during sampling and significantly reduce the costs associated with the monitoring program.

5.3.9 INTEC Facility Monitoring

Eleven existing INTEC aquifer wells will be sampled by INEEL personnel to evaluate if the RAOs will be met. In addition, three wells will be sampled below the HI interbed to evaluate the former INTEC injection well. The choice of a laboratory to perform the sample analysis has yet to be made. Coordination of the laboratory contracting and data management will be performed by the INEEL SMO.

5.3.10 Long-Term Monitoring of the Plume Outside the INTEC Fence

Six wells have been selected for long-term monitoring of the INTEC plume beyond the INTEC security fence. The location and number of wells used for long-term monitoring are contingent upon the results of the baseline groundwater sampling and the plume evaluation results (that is, the contamination within, or below, the HI interbed). The choice of a laboratory to perform the sample analysis has not yet been made. Coordination of the laboratory contracting and data management will be performed by the INEEL SMO.

5.4 Evaluation of Remedial Action Against Performance Measurement Points

Under Group 5, there are two potential sources of contamination that may prevent meeting the SRPA RAOs. The first source is a model-predicted hot spot of I-129, Sr-90, and H-3 that may exist in the HI sedimentary interbed south of INTEC. This predicted hot spot resides within the current boundary of Group 5. The potential existence of this hot spot is the driver for the Plume Evaluation FSP (see Appendix A) presented as part of this MSIP. The second potential source of contamination to Group 5 that may prevent meeting the SRPA RAOs is the flux of contaminants into Group 5 from vadose zone and aquifer contamination present inside the INTEC security fences. The Group 4 remedial actions and OU 3-14 RI/FS are designed to address remediation of this contamination. However, the flux of contaminants migrating from beneath the INTEC facility and the long-term monitoring of the INTEC groundwater plume outside of the INTEC fence are the drivers for the Group 5 LTMP included in this MSIP.

Both of these potential sources of contamination, and the monitoring/remedial actions performed to address them, will be evaluated against the same RAO of preventing COC concentrations from exceeding MCLs in 2095, though the method of evaluation is different between the two sources of contamination.

5.4.1 Evaluation of HI Interbed Testing

The results of the HI interbed testing will be evaluated using the evaluation steps that have been generally defined in the ROD (DOE-ID 1999, Figure 11-6, pages 11-27) and the project flow chart (Figure 2-1 in this report). This evaluation consists of first determining whether there exist zones of groundwater contamination within the model-predicted hot spot, where COC concentrations exceed an action level above which the COC concentration is predicted to continue to exceed MCLs in 2095 and beyond. If no zones exceeding this action level are identified, then the plume evaluation is completed and no risk is assumed to exist from this potential source of contamination.

If a zone(s) is found that exceeds the COC action level, then additional testing in the form of a 24-hour-pump test and sampling will be performed to evaluate whether the zone exceeding the action level has a potential groundwater production capacity to supply a hypothetical residential groundwater user. Again, if the production capacity of the zone(s) is not sufficient to meet the residential user minimum requirement of 0.5 gpm for 24-hour plume evaluation is completed and no risk is assumed to exist from this potential source of contamination.

Finally, if the contaminated zone(s) exceeding COC action levels is capable of producing at least 0.5 gpm for 24 hours, then the volume of this hot spot will be assessed through the creation of isopleth maps. The volume of the hot spot will be evaluated either through numerical modeling or analytical methods to determine if the hypothetical groundwater user could pump from the hot spot for at least one year. If the hot spot is determined to be too small in volume to sustain the groundwater user for one year, then the plume evaluation is completed and no risk, or an acceptable risk, is assumed to exist from this potential source of contamination. If the zone is sufficient to sustain the groundwater user for more than one year, contingent remedial actions are required. The project will proceed as shown in the project flow path on Figure 2-1.

5.4.2 Evaluation of Long-Term Monitoring Results

The data obtained under the LTMP will be evaluated and incorporated into a refined WAG 3 numerical model to determine the flux of contaminants to the SRPA outside the INTEC security fence and to determine if WAG 3 RA will result in meeting the COC concentration limits at the INTEC security fence in 2095. As discussed above, this numerical modeling task will incorporate the results of the long-term monitoring results, as well as data from other sources including the Group 4 monitoring activities, OU 3-14 tank farm RI/FS results, and other sources that may become available. This combined evaluation will be performed for both Groups 4 and 5, which share a common RAO of preventing COC concentrations in the SRPA from exceeding MCLs in 2095 and beyond, outside the INTEC security fence. This evaluation will be performed as part of the CERCLA 5-year-review process as well as at specific points within the Group 4 RA schedule.

The process to develop the numerical simulation of the long-term monitoring data is summarized as follows:

1. Refine the existing conceptual model describing the physical and chemical processes that will be represented in the numerical model.

2. Refine the existing parameterization of the model that meets the conceptual model assumptions. The OU 3-13 RI/FS model parameterization will be the primary source for this initial parameterization.

3. Calibrate the model. The calibration will consist of adjusting parameter values to improve model agreement to the field data.

4. Summarize the sensitivity and uncertainty analysis and how the results will be used. The sensitivity and uncertainty analysis will evaluate the model structure to determine which attributes of the subsurface model have the largest effect on predicted peak concentrations in the aquifer.

5. Summarize the predictive model results and COC concentration predictions at the performance measurement point in 2095.

5.5 Composite Analysis

As part of the CERCLA cumulative risk evaluation, the composite analysis of risks via the groundwater pathway from all sources at INTEC will be updated. As new sites are identified, additional information is obtained about existing sites and various sites are removed or capped, the WAG 3 aquifer model will be updated to account for the change in source terms. To develop an integrated strategy and schedule for updating the model, the following steps, illustrated in Figure 5-1, will be performed:

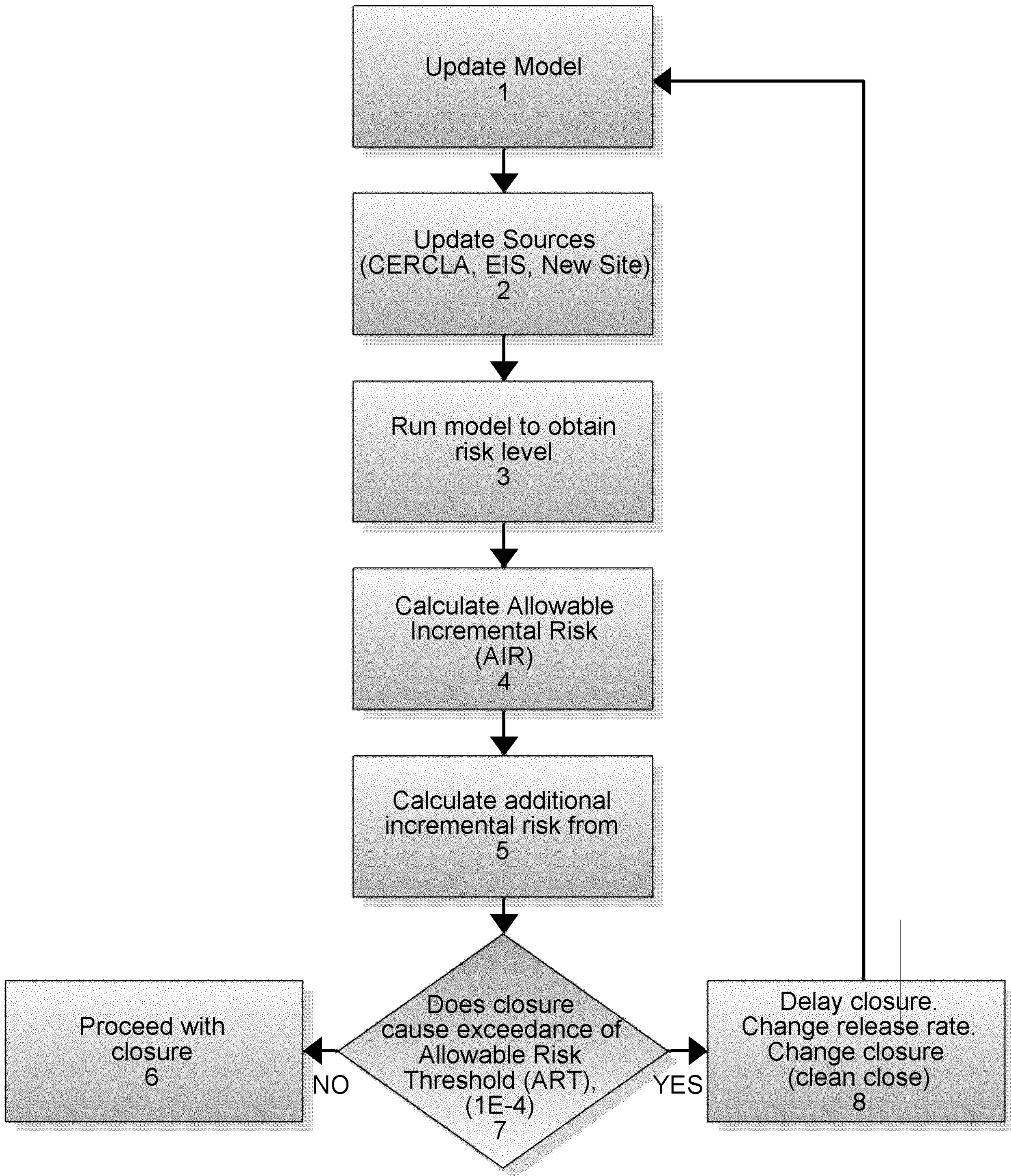


Figure 5-1. Flow chart for composite analysis.

1. Compile all WAG 3 and INTEC groundwater data collection, modeling activities, and decisions into one integrated schedule (groundwater monitoring requirements and data evaluations for other programs are outside the scope of the OU 3-13 RA)

2. Update all the pieces into one model that incorporates new data on Big Lost River, HI interbed, and Kd (Box 1 in Figure 5-1)

3. Add in all the high-level waste (HLW) sources from the EIS (DOE 1999), using the scenario selected in the HLW&FD ROD (Box 2)

4. Add in (or confirm) all CERCLA sources from OU 3-13 and OU 3-14 (Box 2)

5. Update with any newly identified sources from historical releases, as described on the New Site Inclusion Forms (Box 2).

When the composite analysis has been performed, including all known sources, the updated model can be used to determine the allowable incremental risk that can be added (Box 4). Then the impact of any given pending facility closure on the aquifer can be evaluated (Box 5). If the additional source from the closure causes a calculated exceedance of the allowable risk threshold (Box 7), then the closure plans can be modified as necessary to ensure that the RAOs for the aquifer are not exceeded in terms of either risk or MCL (Boxes 6 and 8). This RA does not have the authority to delay or redesign closures that are bound by schedules under other regulatory programs or legal agreements.

The total maximum allowable risk from groundwater ingestion resulting from sources at INTEC was set in the OU 3-13 ROD at 1E-4 excess cancer risks, or 1 in 10,000 by the year 2095. The second RAO is that MCLs cannot be exceeded in the aquifer after the year 2095.

5.5.1 Modeling

The WAG 3 composite analysis focus is a long-term, steady-state model. The model will be run for the period from 2005 to 10,000 years. The intent of the composite analysis modeling is to support long-term decisions, such as facility disposition and closures.

The modeling focus for WAG 3 Groups 4 and 5 is initially non-steady-state modeling using calibration to new data from 2000-2095 to determine whether modeling predictions agree with empirical data. Using more current data, the Group 5 model will be used to determine whether the MCLs for the COCs are exceeded in the aquifer outside INTEC after 2095. These data-gathering and modeling efforts directly support the contingent remedial action decisions established in the OU 3-13 ROD. Information that will be gathered to update the WAG 3 model of the vadose zone and the aquifer for the composite analysis is listed and discussed below.

5.5.2 Hydrologic and Recharge Issues

The Group 4 data collection will

- Determine whether drain-out of the perched water related to relocation of the percolation ponds is occurring as predicted

- Define the contribution of the Big Lost River recharge to the vadose zone

- Predict the final "steady state" of the vadose zone once the drain-out period from the percolation pond relocation is over.

The Group 5 data collection will initially focus on confirming the model predictions for the concentrations of contaminants in the HI interbed. Group 5 data collection will also support the evaluation of flux from inside INTEC security fence into Group 5.

The OU 3-14 RI will include determination of the nature and extent of the contaminated soils at the tank farm. The RI will also investigate moisture transport through the tank farms soils, and the model will be updated to incorporate this data.

5.5.3 Other Source Issues

The OU 3-13 model showed that leaching and transport of contaminants from tank farm soils posed a future risk from Sr-90, Pu-238, Pu-239, Pu-240, and I-129. The risk after year 2095, based on modeling predictions, was from plutonium contamination of the tank farm soils and from I-129 trapped in the HI interbed, combined with minor I-129 contribution from surface sources, which was hydraulically driven by continuous recharge of perched water from the percolation ponds.

The OU 3-14 source update will include a source-term refinement based on tank farm field data. The tank farm soils are the major source of contaminants at INTEC. This investigation will also obtain partition coefficients (K_ds) for some contaminants in the surficial soils, which is the long-term risk driver for groundwater ingestion from the tank farm soils. The data obtained will allow for the WAG 3 model to be updated with a more accurate mass loading of contaminants from the tank farm soils.

The OU 3-14 RI will also refine the secondary source at the injection well. The OU 3-13 model showed that I-129 from the injection well would exceed the MCL after 2095. Most of this was due to "hold up" of the I-129 in the HI interbed. The Group 5 update of the HI interbed portion of the aquifer model may change this prediction.

The HLW& FD EIS model screened out plutonium as a contaminant to the aquifer from the High Level Waste Tank Heels, on the basis that plutonium would either be separated out from the waste or would be bound up in high K_d grout. Even though the grout is assumed to suffer physical breakdown at 500 years, it is also assumed to maintain its chemical properties (including the high K_d for plutonium).

Sources from any newly identified historical release sites will be added into the model during the next scheduled update to the model.

5.5.4 Determination of Impact of Planned Facility Closures

To determine allowable additional incremental risk (AIR) for building closures, the source terms from building closures will be evaluated for incremental impact after all the existing sources are incorporated into the model and the model has been run to establish a baseline of risk to the aquifer.

Using 1E-4 risk as the allowable risk threshold (ART), add together all known sources [CERCLA Incremental Risk (CIR) + High Level Waste Incremental Risk (HLWIR) + New Site Incremental Risk (NSIR)]= total risk level (TRL) (see Figure 5-2). The allowable AIR is ART-TRL. Assume that the AIR cannot all be used by one facility. If the ART is exceeded due to the new source from what will be left in place by the closure, then either the time of the release or the rate of release must be changed until the TRL is < the ART with the new source included.

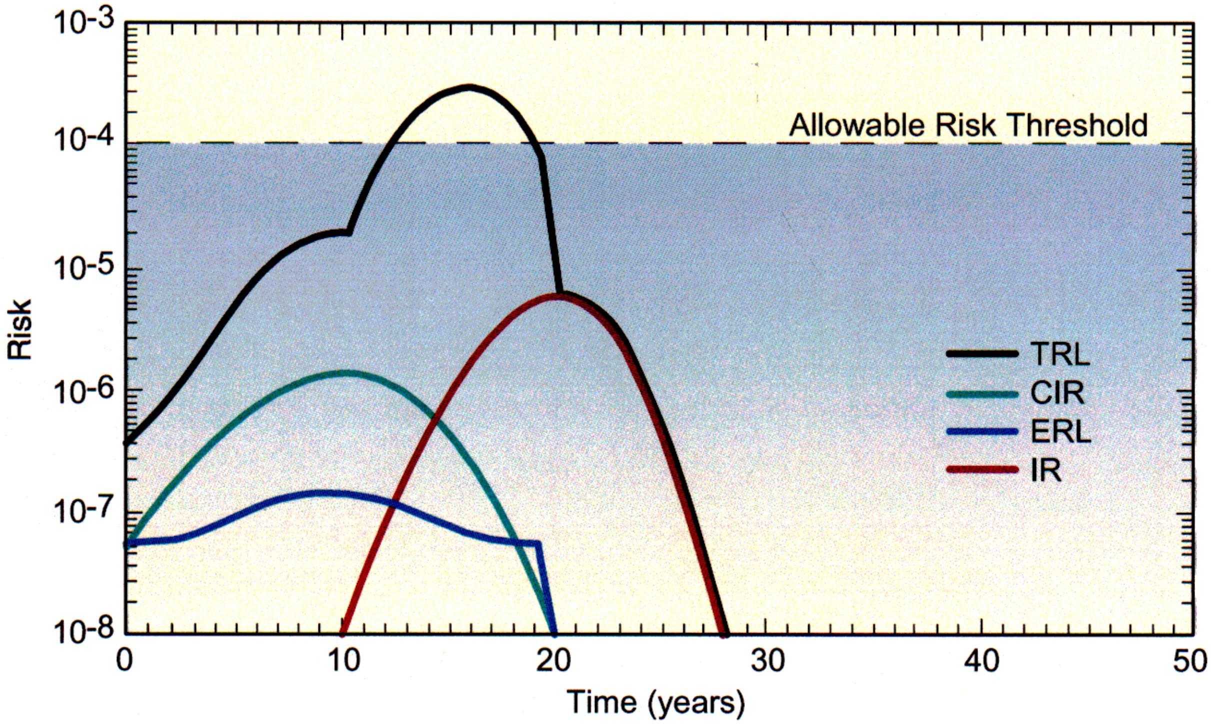


Figure 5-2. Example of the addition of all risk sources to calculate allowable incremental risk (Schafer 1998).

5.6 Field Oversight and Construction Management

The DOE-ID remediation project manager will be responsible for notifying the EPA and IDHW of major project activities such as project startup or closeout and other project activities deemed appropriate. DOE-ID will serve as the single interface point for all routine contact between the EPA, IDHW, BBWI, and the RD/RA contractor.

BBWI is responsible for field oversight and construction management services for this project and will provide field support for health and safety, quality assurance, and landlord services. A project organization chart and associated position descriptions are provided in the project HASP, Appendix G of this report.

Visitors to the project who wish to observe remediation activities must meet badging and training requirements necessary to enter INEEL and INTEC facilities. Project-specific training requirements for visitors are described in the project HASP.

5.7 Project Cost Estimate

The detailed project cost estimate is provided in Appendix E. The costs will be revised for each submittal of the work plan to reflect new information or comments.

5.8 Project Schedule

The RA schedule for Group 5 is presented in Appendix F and includes all project tasks from preparation of this work plan through performance of the RA and submittal of the final RA report.

Administrative and document preparation and field activities are based on an 8-hour day, 5-day work week. This schedule assumes concurrent contractor and DOE-ID document reviews. There is no schedule contingency for delays due to slow or late document reviews, or for field activities impacted by adverse weather conditions. Shown below are the future documents and major Group 5 activities identified on the schedule shown in Appendix F.

OU 3-13 Group 5 MSIP becomes final	11/30/00
Begin INTEC facility monitoring	3/9/01
Group 5 well drilling completed	8/9/02
First INTEC monitoring wells annual report	3/14/02
Statistical sampling 24-hour-pumping report	1/21/03
Final Group 5 monitoring report decision/summary report	9/18/03
Treatability studies complete (if required)	8/6/04
First composite analysis/performance assessment report	3/22/05

5.9 Remedial Action Reporting

Section 6 of this document identifies each of the reports to be developed and submitted in compliance with RD/RA work plan reporting requirements. Reporting requirements mandate that the following reports be prepared:

- Well completion reports
- Statistical sampling 24-hour-pumping report (if determined to be necessary)
- Monitoring report/decision summary report—a primary document
- CERCLA 5-year review(s) and composite analysis
- Routine (annual) sampling and monitoring reports
- Treatability study(ies) final report(s) (if determined to be necessary).

5.10 Health and Safety Plan

The project HASP was prepared specifically for the tasks and conditions expected during implementation and execution of this project. The HASP, which may be updated as site and project conditions dictate, is in Appendix G, and includes the following elements:

- Task site(s) responsibilities
- Personnel training requirements
- Occupational medical program and medical surveillance
- Safe work practices

- Site control and security
- Hazard evaluation
- Personal protective equipment
- Decontamination and radiation control
- Emergency response plan for the task(s).

5.11 Field Sampling Plan

The Plume Evaluation FSP for this project, providing guidance for drilling activities, instrument installation, and collection of sampling during the OU 3-13 plume evaluation, is given as Appendix A of this document.

5.12 Waste Management

The following waste streams are expected to be generated as a result of the Group 5, SRPA remedial action activities:

- Personal protective equipment
- Decontamination wastes/water
- Purge water
- Noncontaminated project waste
- Soil and debris
- Drill cuttings.

Ultimate disposition of these wastes will depend on whether they are radionuclide-contaminated. A description of these waste streams and their appropriate disposition is provided in the project Waste Management Plan, see Appendix H.

5.13 Quality Assurance

Quality assurance and quality control for all phases of this project will be controlled by the Site-approved Quality Assurance Project Plan (QAPjP) for ER projects. The approved QAPjP for all ER projects at the INEEL is EPA-QA/R-5. The quality level designation and record for this project is provided in Appendix I of this document.

5.13.1 Quality Assurance Project Plan

The approved QAPjP for all ER projects at the INEEL is EPA-QA/R-5. Revision 6 of the QAPjP is the latest released version. The latest revision to the ER QAPjP, provided as Appendix J in this document, is based on EPA-QA/R-5 as requested by the State of Idaho and EPA Region X.

The QA objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the "Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites" (DOE-ID 2000b). The QAPjP provides minimum requirements for the following measurement quality indicators: precision, accuracy, representativeness, completeness, and comparability.

The detection limits described in DOE-ID 2000b meet or surpass the decision-based concentrations of the contaminants of concern with the exception of I-129. The I-129 quantitation requirements (reporting threshold) is 1 pCi/L, which necessitates a minimum detection limit (MDL) of 0.1 pCi/L to identify I-129 presence with an acceptance level of confidence. The 0.1 pCi/L MDL can be met using mass spectrometry coupled with a specialized sample introduction system to increase sensitivity (which also serves to lower detection limits). High resolution inductively coupled plasma – mass spectrometry can also meet the 0.1 pCi/L MDL. This capability is being developed in the Analytical Laboratory Department at INTEC, which would allow measurement of environmental samples directly without chemical separation. The minimum detection limits for Sr-90 and H-3 need to be at least 0.8 pCi/L and 2,000 pCi/L, respectively.

5.14 Decontamination

Upon completion of well drilling activities, exposed surfaces of equipment used for well drilling and sampling will be decontaminated at designated decontamination areas in each work zone by brushing and wiping until all visible traces of soil and soil-related staining have been removed. If simple brushing and wiping cannot remove all the soil/staining, decontamination solutions (e.g., water) will be used. All rags, brushes, and spent decontamination solutions will be managed per the project Waste Management Plan (see Appendix H).

5.15 Long-Term Monitoring

The project LTMP (Appendix B) identifies routine and/or periodic monitoring, sampling/analysis, inspection, and maintenance requirements to be implemented following the completion of Group 5 well drilling, 24-hour-pump tests, and treatability study activities. The plan also identifies the requirements for periodic reporting and identification of end-points for long-term. Maintenance activities are expected to continue until the end of FY 2095. The LTMP may be revised as necessary to incorporate changes and additions identified during the implementation of the plan.

5.16 Spill Prevention/Response Program

Any inadvertent spill or release of potentially hazardous materials (i.e., equipment fluids) will be subject to the substantive requirements contained in the INEEL "Emergency Preparedness—Addendum 2, Idaho Chemical Processing Plan" (PLN-114-2).

Handling of the material and/or substance shall be in accordance with the recommendations of the applicable material safety data sheets, which will be located at the project site(s). In the event of a spill, the emergency response plan outlined in the project HASP will be activated. All materials/substances at the work site shall be stored in accordance with applicable regulations in approved containers.

5.17 Other Procedures Relevant to RA Activities

Appendix L identifies additional documents that are relevant to RA activities at the INTEC.

5.18 Storm Water Pollution Prevention Plan

The INEEL must comply with the National Pollutant Discharge Elimination System (40 CFR 122), General Permit for *Storm Water Discharges from Construction Activities,* issued February 17, 1998, by EPA. The General Permit requires a storm water pollution prevention plan for construction activities. The INEEL generic plan and the project-specific plan are provided in Appendix M.

6. REPORTING

Compliance with Group 5 requirements will necessitate the development of several reports for this project. A brief discussion of each is provided below.

6.1 Well Completion Reports

This report, prepared following drilling activities, will include construction diagrams and detail the construction and completion of each well drilled.

6.2 Twenty-Four-Hour Pump Test and Sampling Report

This report will document the results of the 24-hour pump tests that are required on wells when initial sampling activities indicate that COCs concentrations exceed action levels. This report will be prepared only if 24-hour pumping tests are determined necessary.

6.3 Monitoring Report/Decision Summary

This report, a primary document, will be produced following the drilling of the new wells, their sampling and analysis, and 24-hour pump tests if required. The report will include the 24-hour pump test and sampling report and document the results of well monitoring/sampling activities and provide the justification for the decision concerning the need for treatability studies and contingent remedial action. An updated operations and maintenance plan will be included as a part of this report. This report will function as the remedial action report for Group 5 activities.

6.4 CERCLA Five-Year Review(s)

Section XXII-22.1 of the FFA/CO states that "consistent with Section 121(c) of CERCLA, 42 U.S.C. 9621(c), and in accordance with this Agreement, U.S. DOE agrees that EPA may review response action(s) for OUs that allow hazardous substances to remain on-site, no less often than every five (5) years after the initiation of the final response action for such OU to assure that human health and the environment are being protected by the response action being implemented" (DOE-ID 1991). DOE-ID 1994, Section 3.3.6, states: "The 5-year review process involves an evaluation as to whether the selected remedy remains 'protective,' in light of possible new standards, DOE-ID will evaluate, on a case-by-case basis, significant new requirements to ensure that the selected remedy does in-fact remain protective." Compliance with this review will require the development of a report providing information regarding the status of the response action and the need for additional action or work.

6.5 Routine Sampling and Monitoring Reports

The data developed from the routine (annual) sampling of the 11 wells monitoring the flux of contaminants out of INTEC, three wells monitoring contaminants below the HI interbed, and six plume monitoring wells will be used to produce a yearly report.

6.6 Treatability Study(ies) Final Report

Treatability studies will be conducted on wells that have a zone or zones projected to exceed MCLs in 2095 and where pump tests demonstrate that water production equal to or greater than 0.5 gpm for a 24-hour period is possible. Reports will be prepared to document the results of the tests performed. This report(s) will be prepared only if treatability studies are determined necessary.

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Appendix A

Plume Evaluation Field Sampling Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer

DOE/ID-10784
Revision 2

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific "Stand Alone" document number

Appendix B

Long-Term Monitoring Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer

DOE/ID-10783
Revision 2

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific "Stand Alone" document number

(**Note**: The document revision number for this specific document was erroneously stated as revision 2 and should be revision 1)

Appendix C

Groundwater Numerical Modeling Support for the Idaho Nuclear Technology Engineering Center, Operable Unit 3-13, Group-5 Interim Action

[Editor's note: The document that is the subject of Appendix C, Groundwater Numerical Modeling Support for the Idaho Nuclear Technology Engineering Center, Operable Unit 3-13 Group-5 Interim Action, is available only as an Adobe Acrobat file (.pdf).]

A second record copy was attached for Appendix C due to the magnitude of color within this appendix.

To view, please see second record copy.

Appendix D

Data Management Plan for Field and Nonchemical Data from the Operable Unit 3-13, Group 4 and Group 5 Well Installation and Monitoring Projects

DOE/ID-10768
Revision 0

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific
"Stand Alone" document number

[Editor's note: Appendix E, Cost Estimate, does not include a flysheet.]

Bechtel BWXT Idaho, LLC

COST ESTIMATE SUPPORT DATA RECAPITULATION

Project Title: WAG 3 Group 5 SRPA Wells
Estimator: J. C. Grenz
Date: October 23, 2000
Estimate Type: Planning
File: 2975-A
Approved By:

I. **SCOPE OF WORK:** *Brief description of the proposed project.*

The scope of this project is to deepen four existing wells, Drill one new well, and to monitor existing INTEC wells.

A. Deepen four existing USGS wells by core drilling approximately 125 feet deeper.
B. Test the deepened wells and then backfill them back to their current depth..
C. Drill one new deep well.
D. Monitor 47 wells once and 20 wells once each year.
~~E. Construct a temporary evaporation tank and haul the water to it.~~

II. **BASIS OF THE ESTIMATE:** *Drawings, Design Report, Engineers Notes and/or other documentation upon which the estimate is originated.*

Brief scope of work from geologists.

III. **ASSUMPTIONS:** *Conditions statements accepted or supposed true without proof of demonstration. An assumption has a direct impact on total estimated cost.*

A. Work to be performed in 2001 and beyond.
B. Work will be performed by a contractor familiar with drilling at the INEEL.

IV. **CONTINGENCY GUIDELINE IMPLEMENTATION:** *The percentage used for contingency as determined by the contingency allowance guidelines can be altered to reflect the type of construction and conditions that may impact the total estimated cost.*

A 25% contingency, which includes costs for management reserve, has been included in the estimate. This is within the acceptable range for an estimate at this stage of development. Lack of written scope was the primary driver to arrive at this amount of contingency.

COST ESTIMATE SUPPORT DATA RECAPITULATION
- Continued –
Project Title: WAG 3 Group 5 SRPA Wells
File: 2975-A

V. **OTHER COMMENTS/CONCERNS SPECIFIC TO THE ESTIMATE**

A. Costs on the detailed cost sheets are direct costs and do not include overhead, profit or escalation for the drilling sub-contractor.
B. Due to the minimal detail and scope definition, this estimate is considered a "Planning" estimate and is not intended to be used to establish a cost baseline.

Project Name:
WAG 3 Group 5 Wells
Project Location: *INTEC*
Estimate Number: *2975-A*

Project Summary Report

Client: *C. J. Roberts*
Prepared By: *J. C. Grenz*
Estimate Type: *Planning*

LEVEL	REMEDIAL ACTION	Estimate Subtotal	Escalation	Contingency	Contingency %	TOTAL
		$860,517	$863	$215,345	25.00%	$1,076,725
50280	–Yr 2 Sampling (47 wells)	$88,673	$0	$22,168	25.00%	$110,842
50280.01	---Monitor 47 Wells (50280)	$10,899	$0	$2,725	25.00%	$13,624
50280.02	---Analysis & Validation (50290/51101)	$77,774	$0	$19,444	25.00%	$97,218
50350	–Yr 2 Sampling (20 wells)	$53,457	$0	$13,364	25.00%	$66,821
50250.01	---Monitor 20 Wells (50350)	$4,638	$0	$1,160	25.00%	$5,798
50350.02	---Analysis & Validation (50360/50370)	$48,819	$0	$12,205	25.00%	$61,024
51095	–Yr 2 Micropurge (20 wells)	$145,069	$0	$36,267	25.00%	$181,336
51095.01	--- Micropurge	$91,612	$0	$22,903	25.00%	$114,515
51095.02	---Micropurge Sampling 20 Wells (51095)	$4,638	$0	$1,160	25.00%	$5,798
51095.03	---Micropurge Sample Analysis & Valadation (51096/51100)	$48,819	$0	$12,205	25.00%	$61,024
50430	–Yr 3 Sampling (20 wells)	$53,457	$0	$13,364	25.00%	$66,821
50430.01	---Monitor 20 Wells (40430)	$4,638	$0	$1,160	25.00%	$5,798
50430	---Analysis & Validation (50440/50450)	$48,819	$0	$12,205	25.00%	$61,024
50500	–Yr 4 Sampling (20 wells)	$53,457	$0	$13,364	25.00%	$66,821
50500.01	---Monitor 20 Wells (50500)	$4,638	$0	$1,160	25.00%	$5,798
50500.01	---Analysis & Validation (50510/50520)	$48,819	$0	$12,205	25.00%	$61,024
50560	–Yr 5 Sampling (20 wells)	$53,457	$0	$13,364	25.00%	$66,821
50560.01	---Monitor 20 Wells (505560)	$4,638	$0	$1,160	25.00%	$5,798
50560.02	---Analysis & Validation (50570/50580)	$48,819	$0	$12,205	25.00%	$61,024
50620	–Yr 6 Sampling (20 wells)	$53,457	$0	$13,364	25.00%	$66,821

INEEL

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

Project Summary Report

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL		Estimate Subtotal	Escalation	Contingency	Contingency %	TOTAL
50620.01	---Monitor 20 Wells (50620)	$4,638	$0	$1,160	25.00%	$5,798
50620.02	---Analysis & Validation (50630/5640)	$48,819	$0	$12,205	25.00%	$61,024
50730	--Drill 1 New Well/Advance 4 Wells	$359,490	$863	$90,088	25.00%	$450,441
50730.01	---Pull Pumps	$8,324	$0	$2,081	25.00%	$10,405
50730.02	---Advance 4 Wells	$27,753	$0	$6,938	25.00%	$34,692
50730.03	---Sample and Replace Pumps	$26,334	$0	$6,584	25.00%	$32,918
50730.04	---Drill New Well	$113,415	$0	$28,354	25.00%	$141,768
50750.06	---Haul Water	$3,890	$0	$973	25.00%	$4,863
50750.10	---Quality Assurance	$5,258	$0	$1,315	25.00%	$6,573
50730.20	---Monitor New Well , 4 Advanced Wells, & 3 Existing Wells	$499	$0	$125	25.00%	$624
50730.21	---Analysis & Validation of 8 Wells	$85,623	$0	$21,406	25.00%	$107,029
50730.22	---Bore Hole Logging of 8 Wells	$13,369	$0	$3,342	25.00%	$16,711
50750.11	---Engineering and Technical Support	$75,024	$863	$18,972	25.00%	$94,858
ER 1221.04.01	----PROJECT MANAGEMENT	$23,805	$274	$6,020	25.00%	$30,098
ER 1221.04.01.1	-----PM ADMINISTRATION	$10,410	$120	$2,633	25.00%	$13,163
ER 1221.04.01.2	-----PM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE	$13,394	$154	$3,387	25.00%	$16,935
ER 1221.04.08	----CONSTRUCTION MANAGEMENT	$48,960	$563	$12,381	25.00%	$61,903
ER 1221.04.08.1	-----CONSTRUCTION SUPERVISION & ENGINEERING	$23,071	$265	$5,834	25.00%	$29,171
ER 1221.04.08.2	-----CM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE	$25,888	$298	$6,547	25.00%	$32,733
ER 1221.04.09	----RADIATION CONTROL	$2,260	$26	$571	25.00%	$2,857
GAPIF	Non-Org G&A and PIF	$15,013	$0	$3,753	25.00%	$18,766

INEEL

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

Project Summary Report

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL	Estimate Subtotal	Escalation	Contingency	Contingency %	TOTAL
Total WAG 3 Group 5 Wells	**$875,530**	**$863**	**$219,098**	**25.00%**	**$1,095,491**

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50280.01 Monitor 47 Wells (50280)**									
	U.C. per ea	10	T15	211.9	0	20	0	0	231.9
Take Samples	47.00	470	$21.19	$9,959	$0	$940	$0	$0	$10,899
Subtotal				$9,959	$0	$940	$0	$0	$10,899
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$10,899
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$2,490	$0	$235	$0	$0	$2,725
—**Total 50280.01 Monitor 47 Wells (50280)**		470		$12,449	$0	$1,175	$0	$0	$13,624
— **50280.02 Analysis & Validation (50290/51101)**									
	U.C. per ls	0.2		0	0	0	77774	0	77774
Sample/Valadate	1.00	0		$0	$0	$0	$77,774	$0	$77,774
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									
Subtotal				$0	$0	$0	$77,774	$0	$77,774
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$77,774
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$0	$0	$0	$19,444	$0	$19,444
—**Total 50280.02 Analysis & Validation (50290/51101)**		0		$0	$0	$0	$97,218	$0	$97,218
— **50250.01 Monitor 20 Wells (50350)**									
	U.C. per ea	10	T15	211.9	0	20	0	0	231.9
Take Samples	20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638
Subtotal				$4,238	$0	$400	$0	$0	$4,638
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$4,638
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$1,060	$0	$100	$0	$0	$1,160
—**Total 50250.01 Monitor 20 Wells (50350)**		200		$5,298	$0	$500	$0	$0	$5,798
— **50350.02 Analysis & Validation (50360/50370)**									
	U.C. per ls	0.2		0	0	0	48819	0	48819
Sample/Valadate	1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									

CONSTRUCTION DETAIL ITEM REPORT

LEVEL Org/Subcontractor		QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50350.02 Analysis & Validation (50360/50370)**										
Subtotal					$0	$0	$0	$48,819	$0	$48,819
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										$48,819
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$0	$0	$0	$12,205	$0	$12,205
—**Total 50350.02 Analysis & Validation (50360/50370)**			0		$0	$0	$0	$61,024	$0	$61,024
— **51095.01 Micropurge**										
Memo: 10 hours per well for boom truck and 3 men.										
DRILL	U.C. per hr				0	62.5	0	0	0	62.5
Boom Truck		200.00	0		$0	$12,500	$0	$0	$0	$12,500
Memo: Pull 20 pumps, install MP pumps, pull MP pumps, and reinstall regular pumps										
DRILL	U.C. per hr		1	CN-LABR	30.09	0	0	0	0	30.09
Boom Truck Labor		600.00	600	$30.09	$18,054	$0	$0	$0	$0	$18,054
DRILL	U.C. per ea				0	0	3670	0	0	3670
Purchase Pumps & Contrls		10.00	0		$0	$0	$36,700	$0	$0	$36,700
Subtotal					$18,054	$12,500	$36,700	$0	$0	$67,254
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$6,539	$4,527	$13,292	$0	$0	$24,358
Subtotal Estimate										$91,612
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$6,148	$4,257	$12,498	$0	$0	$22,903
—**Total 51095.01 Micropurge**			600		$30,741	$21,284	$62,490	$0	$0	$114,515
— **51095.02 Micropurge Sampling 20 Wells (51095)**										
	U.C. per ea		10	T15	211.9	0	20	0	0	231.9
Take Samples		20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638
Subtotal					$4,238	$0	$400	$0	$0	$4,638
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										$4,638
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$1,060	$0	$100	$0	$0	$1,160
—**Total 51095.02 Micropurge Sampling 20 Wells (51095)**			200		$5,298	$0	$500	$0	$0	$5,798

Project Name:
WAG 3 Group 5 Wells
Project Location: *INTEC*
Estimate Number: *2975-A*

CONSTRUCTION DETAIL ITEM REPORT

Client: *C. J. Roberts*
Prepared By: *J. C. Grenz*
Estimate Type: *Planning*

LEVEL Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— 51095.03 Micropurge Sample Analysis & Valadation (51096/51100)									
U.C. per ls		0.2		0	0	0	48819	0	48819
Sample/Valadate	1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									
Subtotal				$0	$0	$0	$48,819	$0	$48,819
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$48,819
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$0	$0	$0	$12,205	$0	$12,205
—Total 51095.03 Micropurge Sample Analysis & Valadation (51096/51100)		0		$0	$0	$0	$61,024	$0	$61,024
— 50430.01 Monitor 20 Wells (40430)									
U.C. per ea		10	T15	211.9	0	20	0	0	231.9
Take Samples	20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638
Subtotal				$4,238	$0	$400	$0	$0	$4,638
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$4,638
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$1,060	$0	$100	$0	$0	$1,160
—Total 50430.01 Monitor 20 Wells (40430)		200		$5,298	$0	$500	$0	$0	$5,798
— 50430 Analysis & Validation (50440/50450)									
U.C. per ls		0.2		0	0	0	48819	0	48819
Sample/Valadate	1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									
Subtotal				$0	$0	$0	$48,819	$0	$48,819
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$48,819
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$0	$0	$0	$12,205	$0	$12,205
—Total 50430 Analysis & Validation (50440/50450)		0		$0	$0	$0	$61,024	$0	$61,024
— 50500.01 Monitor 20 Wells (50500)									
U.C. per ea		10	T15	211.9	0	20	0	0	231.9
Take Samples	20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638

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CONSTRUCTION DETAIL ITEM REPORT

LEVEL Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50500.01 Monitor 20 Wells (50500)**									
Subtotal				$4,238	$0	$400	$0	$0	$4,638
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$4,638
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$1,060	$0	$100	$0	$0	$1,160
—**Total 50500.01 Monitor 20 Wells (50500)**		200		$5,298	$0	$500	$0	$0	$5,798
— **50500.01 Analysis & Validation (50510/50520)**									
	U.C. per ls	0.2		0	0	0	48819	0	48819
Sample/Valadate	1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									
Subtotal				$0	$0	$0	$48,819	$0	$48,819
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$48,819
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$0	$0	$0	$12,205	$0	$12,205
—**Total 50500.01 Analysis & Validation (50510/50520)**		0		$0	$0	$0	$61,024	$0	$61,024
— **50560.01 Monitor 20 Wells (505560)**									
	U.C. per ea	10	T15	211.9	0	20	0	0	231.9
Take Samples	20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638
Subtotal				$4,238	$0	$400	$0	$0	$4,638
Sales Tax				$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads				$0	$0	$0	$0	$0	$0
Subtotal Estimate									$4,638
Escalation				$0	$0	$0	$0	$0	$0
Contingency				$1,060	$0	$100	$0	$0	$1,160
—**Total 50560.01 Monitor 20 Wells (505560)**		200		$5,298	$0	$500	$0	$0	$5,798
— **50560.02 Analysis & Validation (50570/50580)**									
	U.C. per ls	0.2		0	0	0	48819	0	48819
Sample/Valadate	1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation									

LEVEL Org/Subcontractor		QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50560.02 Analysis & Validation (50570/50580)**										
Subtotal					$0	$0	$0	$48,819	$0	$48,819
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										**$48,819**
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$0	$0	$0	$12,205	$0	$12,205
—**Total 50560.02 Analysis & Validation (50570/50580)**			**0**		**$0**	**$0**	**$0**	**$61,024**	**$0**	**$61,024**
— **50620.01 Monitor 20 Wells (50620)**										
	U.C. per ea		10	T15	211.9	0	20	0	0	231.9
Take Samples		20.00	200	$21.19	$4,238	$0	$400	$0	$0	$4,638
Subtotal					$4,238	$0	$400	$0	$0	$4,638
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										**$4,638**
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$1,060	$0	$100	$0	$0	$1,160
—**Total 50620.01 Monitor 20 Wells (50620)**			**200**		**$5,298**	**$0**	**$500**	**$0**	**$0**	**$5,798**
— **50620.02 Analysis & Validation (50630/5640)**										
	U.C. per ls		0.2		0	0	0	48819	0	48819
Sample/Valadate		1.00	0		$0	$0	$0	$48,819	$0	$48,819
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation										
Subtotal					$0	$0	$0	$48,819	$0	$48,819
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										**$48,819**
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$0	$0	$0	$12,205	$0	$12,205
—**Total 50620.02 Analysis & Validation (50630/5640)**			**0**		**$0**	**$0**	**$0**	**$61,024**	**$0**	**$61,024**
— **50730.01 Pull Pumps**										
Memo: ***10 hours per well for boom truck and 3 men.***										
DRILL	U.C. per hr				0	62.5	0	0	0	62.5
Boom Truck		40.00	0		$0	$2,500	$0	$0	$0	$2,500
Memo: Set packers for each zone and pump samples.										

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Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL	Org/Subcontractor	QTY		Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50730.01 Pull Pumps**											
Memo:	***10 hours per well for boom truck and 3 men.***										
	DRILL	U.C. per hr		1	CN-LABR	30.09	0	0	0	0	30.09
Boom Truck Labor			120.00	120	$30.09	$3,611	$0	$0	$0	$0	$3,611
Subtotal						$3,611	$2,500	$0	$0	$0	$6,111
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$1,308	$905	$0	$0	$0	$2,213
Subtotal Estimate											$8,324
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$1,230	$851	$0	$0	$0	$2,081
—Total 50730.01 Pull Pumps				120		$6,148	$4,257	$0	$0	$0	$10,405
— **50730.02 Advance 4 Wells**											
Memo:	***This is to deepen 4 wells at 125 lf each.***										
	DRILL	U.C. per hr				0	125	0	0	0	125
Core Drill			90.00	0		$0	$11,250	$0	$0	$0	$11,250
Memo: Deepen well by core drilling 125 feet.											
	DRILL	U.C. per hr		1	CN-LABR	30.09	0	0	0	0	30.09
Drill Labor			270.00	270	$30.09	$8,124	$0	$0	$0	$0	$8,124
	DRILL	U.C. per lot				0	1000	0	0	0	1000
Consumables			1.00	0		$0	$1,000	$0	$0	$0	$1,000
Subtotal						$8,124	$12,250	$0	$0	$0	$20,374
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$2,942	$4,437	$0	$0	$0	$7,379
Subtotal Estimate											$27,753
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$2,767	$4,172	$0	$0	$0	$6,938
—Total 50730.02 Advance 4 Wells				270		$13,833	$20,858	$0	$0	$0	$34,692
— **50730.03 Sample and Replace Pumps**											
Memo:	***Sample 4 wells***										
	DRILL	U.C. per hr				0	62.5	0	0	0	62.5
Boom Truck			120.00	0		$0	$7,500	$0	$0	$0	$7,500
Memo: Set packers for each zone and pump samples.											
	DRILL	U.C. per hr		1	CN-LABR	30.09	0	0	0	0	30.09
Boom Truck Labor			360.00	360	$30.09	$10,832	$0	$0	$0	$0	$10,832

CONSTRUCTION DETAIL ITEM REPORT

LEVEL	Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50730.03 Sample and Replace Pumps**										
Memo:	***Sample 4 wells***									
	DRILL	U.C. per lb			0	0	0.1	0	0	0.1
Bentonite		10,000.00	0		$0	$0	$1,000	$0	$0	$1,000
Subtotal					$10,832	$7,500	$1,000	$0	$0	$19,332
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$3,923	$2,718	$362	$0	$0	$7,002
Subtotal Estimate										$26,334
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$3,689	$2,554	$341	$0	$0	$6,584
—Total 50730.03 Sample and Replace Pumps			360		$18,445	$12,770	$1,703	$0	$0	$32,918
— **50730.04 Drill New Well**										
Memo:	***New deep well***									
	DRILL	U.C. per lf			42	72	0	0	0	114
Drill Well		570.00	0		$23,940	$41,040	$0	$0	$0	$64,980
	DRILL	U.C. per lf			3	5	0	0	0	8
Install Casing(5,10,14,18)		1,110.00	0		$3,330	$5,550	$0	$0	$0	$8,880
Memo: Cassings are GFE										
	DRILL	U.C. per cf			8.3	14.2	1	0	0	23.5
Grout and Gravel		400.00	0		$3,320	$5,680	$400	$0	$0	$9,400
Subtotal					$30,590	$52,270	$400	$0	$0	$83,260
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$11,079	$18,931	$145	$0	$0	$30,155
Subtotal Estimate										$113,415
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$10,417	$17,800	$136	$0	$0	$28,354
—Total 50730.04 Drill New Well			0		$52,086	$89,001	$681	$0	$0	$141,768
— **50750.06 Haul Water**										
	DRILL	U.C. per hr	1	CN-TRHV	32.6	15	0	0	0	47.6
Haul Water to SSSTF (175k gal)		60.00	60	$32.60	$1,956	$900	$0	$0	$0	$2,856

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL	Org/Subcontractor	QTY		Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— 50750.06 Haul Water											
Subtotal						$1,956	$900	$0	$0	$0	$2,856
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$708	$326	$0	$0	$0	$1,034
Subtotal Estimate											$3,890
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$666	$306	$0	$0	$0	$973
—Total 50750.06 Haul Water				60		$3,331	$1,532	$0	$0	$0	$4,863
— 50750.10 Quality Assurance											
00201000	7260	U.C. per Wk		10	T12	250.1	0	0	0	0	250.1
Inspection and Overview			6.00	60	$25.01	$1,501	$0	$0	$0	$0	$1,501
00203000	7260	U.C. per Wk		2	T12	50.02	0	0	0	0	50.02
Vendor Data Review and Field Problems			6.00	12	$25.01	$300	$0	$0	$0	$0	$300
00205000	7260	U.C. per Ea		20	T12	500.2	0	0	0	0	500.2
Inspection Plan Preparation			1.00	20	$25.01	$500	$0	$0	$0	$0	$500
	7260	U.C. per Hr		0.1	Z03	5.232	0	0	0	0	5.232
Quality Assurance Supervision @ 10%			92.00	9	$52.32	$481	$0	$0	$0	$0	$481
Subtotal						$2,782	$0	$0	$0	$0	$2,782
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$2,476	$0	$0	$0	$0	$2,476
Subtotal Estimate											$5,258
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$1,315	$0	$0	$0	$0	$1,315
—Total 50750.10 Quality Assurance				101		$6,573	$0	$0	$0	$0	$6,573
— 50730.20 Monitor New Well , 4 Advanced Wells, & 3 Existing Wells											
		U.C. per ea		0.2	T15	4.238	0	2	0	0	6.238
Take Samples			80.00	16	$21.19	$339	$0	$160	$0	$0	$499
Subtotal						$339	$0	$160	$0	$0	$499
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$0	$0	$0	$0	$0	$0
Subtotal Estimate											$499
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$85	$0	$40	$0	$0	$125
—Total 50730.20 Monitor New Well , 4 Advanced Wells, & 3 Existing Wells				16		$424	$0	$200	$0	$0	$624

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Project Name:
WAG 3 Group 5 Wells
Project Location: *INTEC*
Estimate Number: *2975-A*

CONSTRUCTION DETAIL ITEM REPORT

Client: *C. J. Roberts*
Prepared By: *J. C. Grenz*
Estimate Type: *Planning*

LEVEL	Org/Subcontractor	QTY		Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **50730.21 Analysis & Validation of 8 Wells**											
		U.C. per ls		0.2		0	0	0	85623	0	85623
Sample/Valadate			1.00	0		$0	$0	$0	$85,623	$0	$85,623
Memo: Water Samples: Gross Beta, Tritium, Uranium, Neptunium, Plutonium, Americium, Iodine, Strontium, Gross Alpha/Beta, Anions, Metals, Rad Valadation, and I&MCA Validation											
Subtotal						$0	$0	$0	$85,623	$0	$85,623
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$0	$0	$0	$0	$0	$0
Subtotal Estimate											$85,623
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$0	$0	$0	$21,406	$0	$21,406
—Total 50730.21 Analysis & Validation of 8 Wells				0		$0	$0	$0	$107,029	$0	$107,029
— **50730.22 Bore Hole Logging of 8 Wells**											
	DRILL	U.C. per hr				0	62.5	0	0	0	62.5
Boom Truck			80.00	0		$0	$5,000	$0	$0	$0	$5,000
Memo: Set packers for each zone and pump samples.											
	DRILL	U.C. per hr		1	CN-LABR	30.09	0	0	0	0	30.09
Boom Truck Labor			160.00	160	$30.09	$4,814	$0	$0	$0	$0	$4,814
Subtotal						$4,814	$5,000	$0	$0	$0	$9,814
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$1,744	$1,811	$0	$0	$0	$3,555
Subtotal Estimate											$13,369
Escalation						$0	$0	$0	$0	$0	$0
Contingency						$1,640	$1,703	$0	$0	$0	$3,342
—Total 50730.22 Bore Hole Logging of 8 Wells				160		$8,198	$8,514	$0	$0	$0	$16,711
— **ER 1221.04.01.1 PM ADMINISTRATION**											
	6210	U.C. per Wk		20	E30	716	0	0	0	0	716
Project Manager Cost			6.00	120	$35.80	$4,296	$0	$0	$0	$0	$4,296

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL Org/Subcontractor	QTY		Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— **ER 1221.04.01.1 PM ADMINISTRATION**										
6210	U.C. per Hr		0.1	Z04	4.929	0	0	0	0	4.929
Project Management - Management Support - 10% Of P.M. Total		120.00	12	$49.29	$591	$0	$0	$0	$0	$591
Subtotal					$4,887	$0	$0	$0	$0	$4,887
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$5,523	$0	$0	$0	$0	$5,523
Subtotal Estimate										$10,410
Escalation					$120	$0	$0	$0	$0	$120
Contingency					$2,633	$0	$0	$0	$0	$2,633
—Total ER 1221.04.01.1 PM ADMINISTRATION			132		$13,163	$0	$0	$0	$0	$13,163
— **ER 1221.04.01.2 PM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE**										
6210	U.C. per Lot		40	E30	1432	0	0	0	0	1432
Assemble Planning Team		1.00	40	$35.80	$1,432	$0	$0	$0	$0	$1,432
6210	U.C. per Ea		5	E30	179	0	0	0	0	179
Initiate Work Control Form (WCF)		1.00	5	$35.80	$179	$0	$0	$0	$0	$179
6210	U.C. per Wk		5	E30	179	0	0	0	0	179
Update WCF (1 Hour / Day)		6.00	30	$35.80	$1,074	$0	$0	$0	$0	$1,074
6210	U.C. per Lot		40	E30	1432	0	0	0	0	1432
Initiate Hazards Analysis Process		1.00	40	$35.80	$1,432	$0	$0	$0	$0	$1,432
6210	U.C. per Lot		30	E30	1074	0	0	0	0	1074
Prepare Supporting Project Documents		1.00	30	$35.80	$1,074	$0	$0	$0	$0	$1,074
6210	U.C. per Ea		10	E30	358	0	0	0	0	358
Post-Job Review		1.00	10	$35.80	$358	$0	$0	$0	$0	$358
6210	U.C. per Hr		0.1	Z04	4.929	0	0	0	0	4.929
PM Management Support - 10% Of Total		150.00	15	$49.29	$739	$0	$0	$0	$0	$739
Subtotal					$6,288	$0	$0	$0	$0	$6,288
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$7,106	$0	$0	$0	$0	$7,106
Subtotal Estimate										$13,394
Escalation					$154	$0	$0	$0	$0	$154
Contingency					$3,387	$0	$0	$0	$0	$3,387
—Total ER 1221.04.01.2 PM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE			170		$16,935	$0	$0	$0	$0	$16,935
— **ER 1221.04.08.1 CONSTRUCTION SUPERVISION & ENGINEERING**										
00400100 6340	U.C. per Wk		10	E30	358	0	0	0	0	358
Construction Coordinator or Manager		6.00	60	$35.80	$2,148	$0	$0	$0	$0	$2,148

CONSTRUCTION DETAIL ITEM REPORT

LEVEL	Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— ER 1221.04.08.1 CONSTRUCTION SUPERVISION & ENGINEERING										
00400200	6340	U.C. per Wk	15	E30	537	0	0	0	0	537
Construction Engineer		6.00	90	$35.80	$3,222	$0	$0	$0	$0	$3,222
	2300	U.C. per Wk	20	P21	544.4	0	0	0	0	544.4
Subcontract Admin		6.00	120	$27.22	$3,266	$0	$0	$0	$0	$3,266
00400400	6340	U.C. per Wk	2	E30	71.6	0	0	0	0	71.6
ES&H		6.00	12	$35.80	$430	$0	$0	$0	$0	$430
00400500	6340	U.C. per Wk	2	E30	71.6	0	0	0	0	71.6
Quality		6.00	12	$35.80	$430	$0	$0	$0	$0	$430
00401400	6340	U.C. per Hour	1	CN-CMOTHE	11.36	0	0	0	0	11.36
Pool Account (Direct Hours @ $24 Per Hour)		150.00	150	$11.36	$1,704	$0	$0	$0	$0	$1,704
Subtotal					$11,200	$0	$0	$0	$0	$11,200
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$11,872	$0	$0	$0	$0	$11,872
Subtotal Estimate										$23,071
Escalation					$265	$0	$0	$0	$0	$265
Contingency					$5,834	$0	$0	$0	$0	$5,834
—Total ER 1221.04.08.1 CONSTRUCTION SUPERVISION & ENGINEERING			444		$29,171	$0	$0	$0	$0	$29,171
— ER 1221.04.08.2 CM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE										
	6340	U.C. per Lot	10	E30	358	0	0	0	0	358
Initiate Hazards Analysis Process		1.00	10	$35.80	$358	$0	$0	$0	$0	$358
	6340	U.C. per Lot	40	E30	1432	0	0	0	0	1432
Assemble Planning Team		1.00	40	$35.80	$1,432	$0	$0	$0	$0	$1,432
	6340	U.C. per Lot	20	E30	716	0	0	0	0	716
Develop Initial JSA & Input To Work Plans		1.00	20	$35.80	$716	$0	$0	$0	$0	$716
	6340	U.C. per Wk	8	E30	286.4	0	0	0	0	286.4
Project Continuous Surveillance (2 Hours / Day)		6.00	48	$35.80	$1,718	$0	$0	$0	$0	$1,718
	6340	U.C. per Lot	25	E30	895	0	0	0	0	895
Prepare Supporting Project Documents		1.00	25	$35.80	$895	$0	$0	$0	$0	$895
	6340	U.C. per Lot	40	E30	1432	0	0	0	0	1432
Develop Work Order		1.00	40	$35.80	$1,432	$0	$0	$0	$0	$1,432
	6340	U.C. per SME	5	E30	179	0	0	0	0	179
Approve Work Orders - Subject Matter Expert (SME) (5 Hours / SME)		1.00	5	$35.80	$179	$0	$0	$0	$0	$179
	6340	U.C. per Lot	5	E30	179	0	0	0	0	179
Approve Work Orders - CM		1.00	5	$35.80	$179	$0	$0	$0	$0	$179

Project Name: **WAG 3 Group 5 Wells**
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: *C. J. Roberts*
Prepared By: *J. C. Grenz*
Estimate Type: ***Planning***

LEVEL	Org/Subcontractor	QTY		Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— ER 1221.04.08.2 CM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE											
	6340	U.C. per Wk		4	E30	143.2	0	0	0	0	143.2
Schedule Work On POD (1 Hour / Day)			6.00	24	$35.80	$859	$0	$0	$0	$0	$859
	6340	U.C. per Ea		20	E30	716	0	0	0	0	716
Outages (20 Hours / Outage)			1.00	20	$35.80	$716	$0	$0	$0	$0	$716
	6340	U.C. per Ea		20	E30	716	0	0	0	0	716
Subsurface Investigation (20 Hours / SI)			1.00	20	$35.80	$716	$0	$0	$0	$0	$716
00401400	6340	U.C. per Hour		1	CN-CMOTHE	11.36	0	0	0	0	11.36
Pool Account (Direct Hours @ $24 Per Hour)			260.00	260	$11.36	$2,954	$0	$0	$0	$0	$2,954
Subtotal						$12,154	$0	$0	$0	$0	$12,154
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$13,734	$0	$0	$0	$0	$13,734
Subtotal Estimate											$25,888
Escalation						$298	$0	$0	$0	$0	$298
Contingency						$6,547	$0	$0	$0	$0	$6,547
—Total ER 1221.04.08.2 CM - CONDUCT OF OPERATIONS/CONDUCT OF MAINTENANCE				517		$32,733	$0	$0	$0	$0	$32,733
— ER 1221.04.09 RADIATION CONTROL											
	7620	U.C. per Wk		10	U60	246.6	0	0	0	0	246.6
Radiological Control Technicians			4.00	40	$24.66	$986	$0	$0	$0	$0	$986
	7610	U.C. per Hr		0.1	Z03	5.232	0	0	0	0	5.232
Radiation Control - Management Support - 10% OF RCT Total			40.00	4	$52.32	$209	$0	$0	$0	$0	$209
Subtotal						$1,196	$0	$0	$0	$0	$1,196
Sales Tax						$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads						$1,064	$0	$0	$0	$0	$1,064
Subtotal Estimate											$2,260
Escalation						$26	$0	$0	$0	$0	$26
Contingency						$571	$0	$0	$0	$0	$571
—Total ER 1221.04.09 RADIATION CONTROL				44		$2,857	$0	$0	$0	$0	$2,857
— GAPIF Non-Org G&A and PIF											
PF	NOGAPIF	U.C. per $				0	0	0	0	1	1
Procurement Fee %			10,879.00	0		$0	$0	$0	$0	$10,879	$10,879

Project Name:
WAG 3 Group 5 Wells
Project Location: ***INTEC***
Estimate Number: ***2975-A***

CONSTRUCTION DETAIL ITEM REPORT

Client: ***C. J. Roberts***
Prepared By: ***J. C. Grenz***
Estimate Type: ***Planning***

LEVEL	Org/Subcontractor	QTY	Hrs	Crew/Rate	Labor	Const Eqp	Matl	S/C	Other	TOTAL
— GAPIF Non-Org G&A and PIF										
G&A	NOGAPIF	U.C. per $			0	0	0	0	1	1
G&A Fee %		4,134.00	0		$0	$0	$0	$0	$4,134	$4,134
Subtotal					$0	$0	$0	$0	$15,013	$15,013
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$0	$0	$0	$0	$0	$0
Subtotal Estimate										$15,013
Escalation					$0	$0	$0	$0	$0	$0
Contingency					$0	$0	$0	$0	$3,753	$3,753
—Total GAPIF Non-Org G&A and PIF			0		$0	$0	$0	$0	$18,766	$18,766
Subtotal WAG 3 Group 5 Wells					$152,216	$92,920	$41,600	$456,311	$15,013	$758,060
Sales Tax					$0	$0	$0	$0	$0	$0
INEEL ORG Labor/Subcontractor Overheads					$70,018	$33,653	$13,799	$0	$0	$117,470
Subtotal Estimate										$875,530
Escalation					$863	$0	$0	$0	$0	$863
Contingency					$55,774	$31,643	$13,850	$114,078	$3,753	$219,098
Total WAG 3 Group 5 Wells			4,666		$278,871	$158,217	$69,249	$570,389	$18,766	$1,095,491

[

[Editor's note: Appendix F, Project Schedule, does not include a flysheet.]

uration	Schedule Start	Schedule Finish
1538d	03/16/00	05/09/06
181d	03/16/00	11/30/00
70d	03/16/00	06/22/00
0d	06/22/00	06/22/00
0d	06/22/00	06/22/00
58d	06/23/00	09/14/00
0d	09/14/00	09/14/00
0d	09/14/00	09/14/00
32d	09/15/00	10/30/00
0d	10/30/00	10/30/00
0d	10/30/00	10/30/00
11d	10/31/00	11/14/00
10d	11/15/00	11/30/00
0d	11/30/00	11/30/00
1302d	02/23/01	05/09/06
0d	02/23/01	02/23/01
34d	03/09/01	04/25/01
44d	04/26/01	06/27/01
22d	06/28/01	07/30/01
22d	10/03/01	11/01/01
43d	11/02/01	01/11/02
22d	01/14/02	02/12/02
65d	10/03/01	01/11/02
44d	01/14/02	03/14/02
22d	03/15/02	04/15/02
22d	04/16/02	05/15/02
10d	05/16/02	05/30/02
10d	05/31/02	06/13/02
22d	02/13/02	03/14/02
22d	03/15/02	04/15/02
22d	04/16/02	05/15/02
22d	09/30/02	10/29/02
44d	10/30/02	01/09/03
22d	01/10/03	02/10/03
20d	02/11/03	03/10/03
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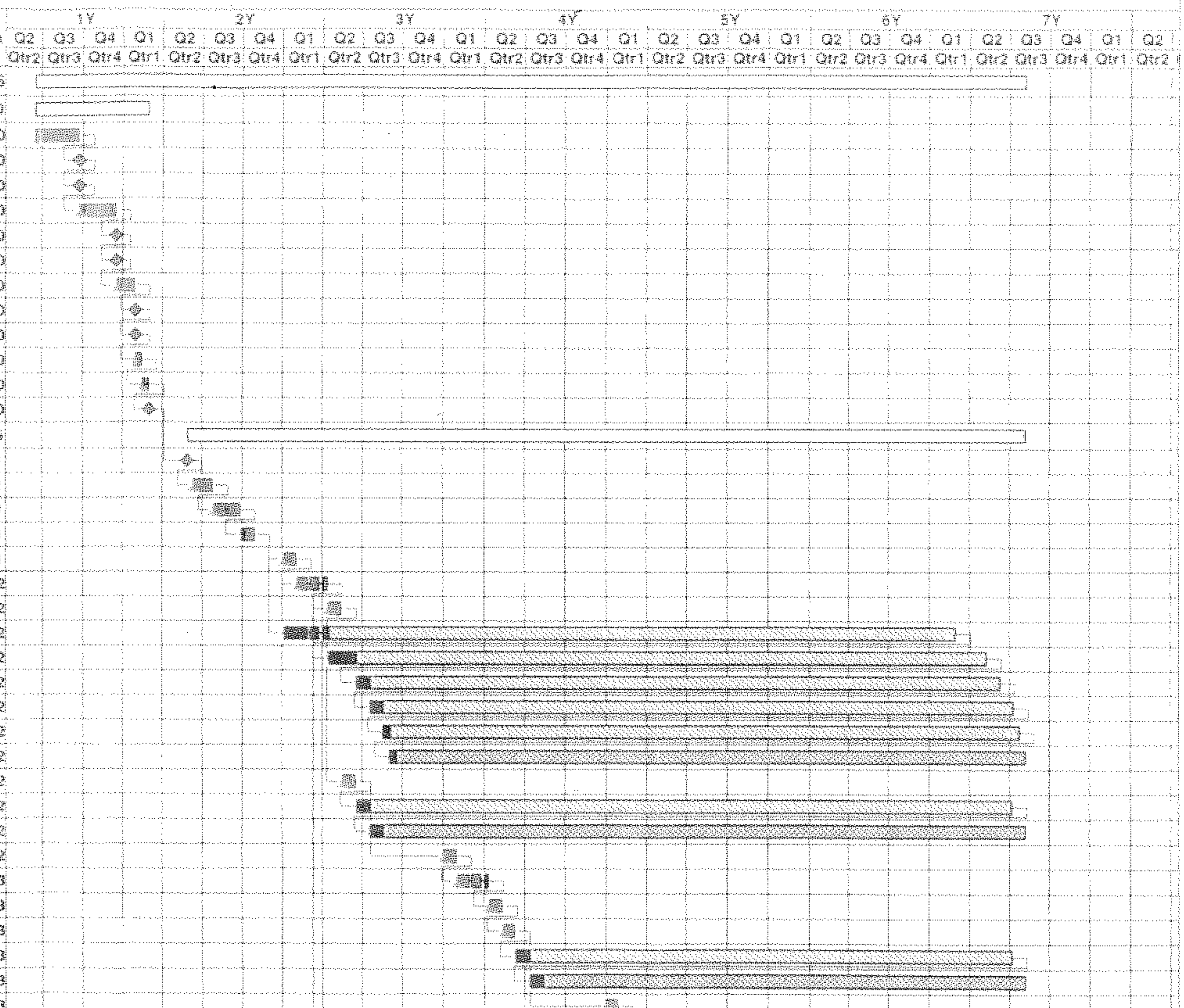
22d	09/26/03	10/27/03



44d	11/08/04	01/18/05
22d	01/19/05	02/17/05
20d	02/18/05	03/17/05
22d	03/18/05	04/18/05
22d	04/19/05	05/18/05
22d	09/28/05	10/27/05
44d	10/28/05	01/09/06
22d	01/10/06	02/08/06
20d	02/09/06	03/08/06
22d	03/09/06	04/07/06
22d	04/10/06	05/09/06
34d	01/14/02	02/28/02
0d	02/28/02	02/28/02
21d	03/01/02	03/29/02
5d	04/01/02	04/05/02
22d	04/08/02	05/07/02
0d	04/08/02	04/08/02
66d	05/08/02	08/09/02
22d	08/12/02	09/11/02
15d	09/12/02	10/02/02
44d	10/03/02	12/05/02
10d	12/06/02	12/19/02
12d	01/06/03	01/21/03
5d	12/20/02	01/03/03
44d	01/22/03	03/24/03
22d	03/25/03	04/23/03
13d	03/25/03	04/10/03
112d	04/11/03	09/18/03
32d	08/04/03	09/17/03
0d	09/18/03	09/18/03
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33d	09/19/03	11/04/03
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0d	12/23/03	12/23/03
11d	12/24/03	01/15/04
11d	01/16/04	01/30/04
0d	01/30/04	01/30/04
567d	02/05/04	05/09/06
130d	02/05/04	08/06/04
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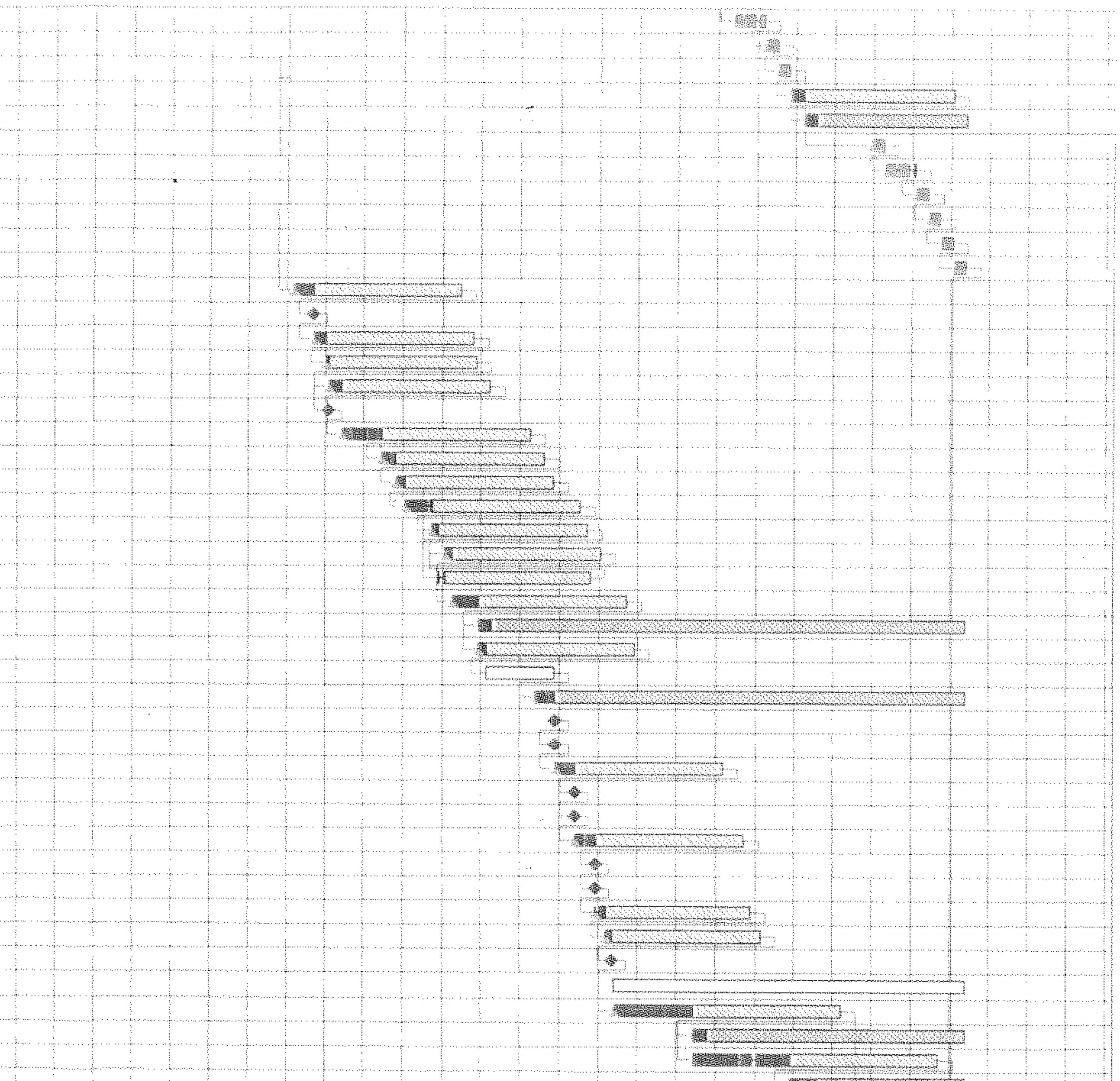
45d	03/23/05	05/24/05



Appendix G

Health and Safety Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer

INEEL/EXT-2000-00817
Revision 0

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific "Stand Alone" document number

Appendix H

Waste Management Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer Project

DOE/ID-10829 Revision 1

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific "Stand Alone" document number

(**NOTE:** The document revision number for this specific document was erroneously stated as revision 1 and should be revision 2)

Appendix I

Quality Level Designation and Record

414.02
11/10/98
Rev. 02

QUALITY LEVEL DESIGNATION AND RECORD

Quality Level Evaluation Performed By: R. G. Thompson   Date: 5/15/00

Facility/Structure/System: OU 3-13 Snake River Plain Aquifer   Quality Level: 3

IDENTIFICATION OF ITEM	QUALITY LEVEL DESIGNATION	TECHNICAL JUSTIFICATION
Well Drilling & Completion	3	INEEL/INT-2000-00036
Well Sampling & Analysis	3	INEEL/INT-2000-00036

Note: Assign and record quality level in accordance with MCP-540, and obtain appropriate approvals. Completed and approved form becomes a quality assurance record. (Master Equipment List may be used as a Q-List.)

R. G. Thompson	R G Thompson	5/17/2000
Quality Assurance Concurrence Printed/Typed Name	Quality Assurance Concurrence Signature	Date
C. J. Roberts		
Facility/Program/Project Approval Printed/Typed Name	Facility/Program/Project Approval Signature	Date

431.02
08/12/98
Rev. 06

ENGINEERING DESIGN FILE

Functional File No. INEEL/INT-99-00723
EDF No. EDF-ER-076

1. Project File No. ____________ 2. Project/Task OU 3-13 POST-ROD GROUNDWATER MONITORING

3. Subtask Hazard Classification

4. Title: INTEC Groundwater Monitoring Well Drilling Hazard Classification

5. Summary: The purpose of this Engineering Design File is to document the hazard classification of the INTEC groundwater monitoring well drilling project and to support the determination that the project can be safely conducted under the auspices of a Health and Safety Plan.

6. Distribution (complete package): Eric Neher, Carlton Roberts

Distribution (summary package only):

7. Review (R) and Approval (A) Signatures:

	R/A	Printed Name	Signature	Date
Author	R	Tharan L. Cook	Tharan L. Cook	7/15/99
Independent Verification	R	Rodney Peatross	Rod Peatross	7/15/99
Requestor	A	Carlton Roberts	[illegible]	8/2/99

431.12
08/24/98
Rev. 01

REQUEST FOR DETERMINATION OF SAFETY ANALYSIS REQUIREMENTS

Date: July 14, 1999

A. To Be Completed by Project Manager, Project Management Department

1. Project OU 3-13 Post-Rod Groundwater Monitoring

   Project Manager Robert E. James Mail Stop 3953

   Type: ☐ Line Item ☐ GPP ☐ CE ☐ Work Order ☒ Other ER Project

2. Reference Documents Submitted:

   Check the documents submitted with this request:

   ☐ Technical Functional Requirements
   ☐ Design Criteria
   ☐ Conceptual Design Report
   ☐ Environmental Evaluation or EIS
   ☐ USQ Screening
   ☐ Feasibility Studies
   ☐ Project Plan
   ☐ Work Order
   ☐ Engineering Change Form
   ☒ Other ER Project

B. To Be Completed by the Cognizant Safety Analysis Organization

Task Number

1. New Facility Project:

   PSAR required before facility construction? ☐ Yes ☒ No
   New SAR or revision/addendum to an existing SAR required before operation? ☐ Yes ☒ No
   Will this be a nuclear facility (see MCP-2446)? ☐ Yes ☒ No

2. Existing Facility Modifications:

   USQ evaluation required? ☐ Yes ☒ No EH 7/27/99
   Revision/addendum to an existing SAR required? ☐ Yes ☒ No
   Descriptive changes to an existing SAR required? ☐ Yes ☒ No
   Hazard category/classification Other Industrial

3. Justification for Items B.1 - B.2:

   See attached hazard classification

4. Proposed schedule for Company and DOE approvals of required Safety Analysis:

   N/A

Request for Safety Analysis Approval

E. E. Hochhalter	E. E. Hochhalter	7/27/99
Manager, Safety Analysis Unit/Department Print/Type Name	Manager, Safety Analysis Unit/Department Signature	Date

Distribution: Copy for Project Manager; original and one copy to Safety Analysis. Original back to Project Manager when Safety Analysis determination is completed.

OU 3-13 GROUNDWATER MONITORING HAZARD CLASSIFICATION

SUMMARY

The purpose of this hazard classification is to present an evaluation of the potential hazards associated with proposed OU 3-13 groundwater monitoring well drilling activities that could affect the public, the workers, or the environment. This evaluation is based on preliminary project information, the draft OU 3-13 Record of Decision (ROD), and data collected through previous sampling activities.

HAZARD CLASSIFICATION

Groundwater monitoring well construction activities are classified as "other industrial," based on the guidance presented in DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* DOE-ID N 420.Al, *Safety Basis Review and Approval Process,* and DOE-EM-STD-5502-94, *Hazard Baseline Documentation,* and the OU 3-13 ROD. No appreciable hazardous waste or hazardous chemical quantities have been identified in this hazard classification; nevertheless, the project will be conducted under the administrative control of a health and safety plan (see Appendix G to this report) to ensure compliance with applicable occupational safety and health standards.

1. INTRODUCTION

This project consists of three separate well drilling operations in and around the Idaho Nuclear Technology and Engineering Center (INTEC). These activities, and other INTEC remedial actions, are identified and divided into seven groups, in the INTEC Record of Decision (INEEL 1999). This evaluation addresses the construction of new groundwater monitoring wells planned for Group 5, Snake River Plain Aquifer. Another well drilling operation is planned for monitoring a new INTEC CERCLA Disposal Facility; however, since the location of the facility has not been determined as of this writing, it will not be specifically addressed herein.

2. DESCRIPTION

2.1 OU 3-13, Group 5, Snake River Plain Aquifer

The Snake River Plain Aquifer (SRPA) lies beneath the INTEC at a depth of approximately 450 ft and has been contaminated through operation of injection well CPP-23. Additionally, contaminated soils and perched water have been predicted to continue to contribute contaminants. This project consists of deepening four wells and drilling one new monitoring well south of the INTEC in the zone predicted to contain the highest concentration of I-129 contamination. The wells will be monitored and sampled to determine the need for further remediation and will be drilled to a depth of approximately 650 ft. The locations of the four wells to be deepened and the proposed location of the new well are shown in Figure I-1.

3. HAZARDOUS MATERIAL INVENTORY

3.1 Groundwater Contaminants

DOE Order 5480.23, *Nuclear Safety Analysis Reports,* requires that radioactive and chemical materials be inventoried by type and amount. Those quantities of material are then to be evaluated using the guidance presented in DOE-STD-1027-92 and DOE-EM-STD-5502-94, to establish facility or project hazard categorization. In this case, due to the extremely low quantities of material expected to be encountered during well drilling activities, the inventory of contaminants has been taken from groundwater sampling results that are presented in the Remedial Investigation/Feasibility Study. The values selected are provided in Table I-1.

Table I–1. Groundwater sample results.

Snake River Plain Aquifer		
Contaminant	Concentration	TQ/RQ
Sr-90	84 pCi/L	1.6E+01 Ci/ 1.0E-01 Ci
tritium	30,700 pCi/L	1.0E+03 Ci/ 1.0 Ci
Tc-99	448 pCi/L	1.7E+03 Ci/ 10 Ci
I-129	3.8 pCi/L	6.0E-02 Ci/ 1.0E-03 Ci
magnesium	63 μg/L	NA

a. TQ = Threshold Quantity, DOE-STD-1027-92
RQ = Reportable Quantity, 40 CFR 302

b. Not listed in 40 CFR 302, Table 302.4

3.2 Evaluation

A comparison of the contaminant concentrations to the Threshold and/or Reportable Quantity values shows that many orders of magnitude exist between the levels of radioactive and chemical contaminants expected to be encountered during these well drilling projects, and the classification thresholds. On this basis, there are no radiological or chemical hazards associated with this project. The releasable quantities of contaminants associated with the well drilling activities would be so small as to be negligible and would result in no threat to the workers, the environment, or the public.

Further, Figure I-1 presents an overlay of the proposed locations of the Group 5 monitoring wells and the existing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites inside the INTEC security fence. As can be seen on the drawing, there are no conflicts between proposed well locations and the sites, therefore, none of the wells will be drilled into potential underground hazards and no further analysis is necessary.

3.3 General Project Hazards

Table I-2 lists the potential general hazards associated with the OU 3-13 groundwater monitoring well drilling project activities. This list cites common and project-specific hazards, specifies whether they are applicable to the project, identifies the appropriate occupational health and safety standards, and assesses each hazard as being routine or significant. Any hazards determined to be significant are analyzed further while routine hazards will be addressed in the project health and safety plan (Appendix G to this report).

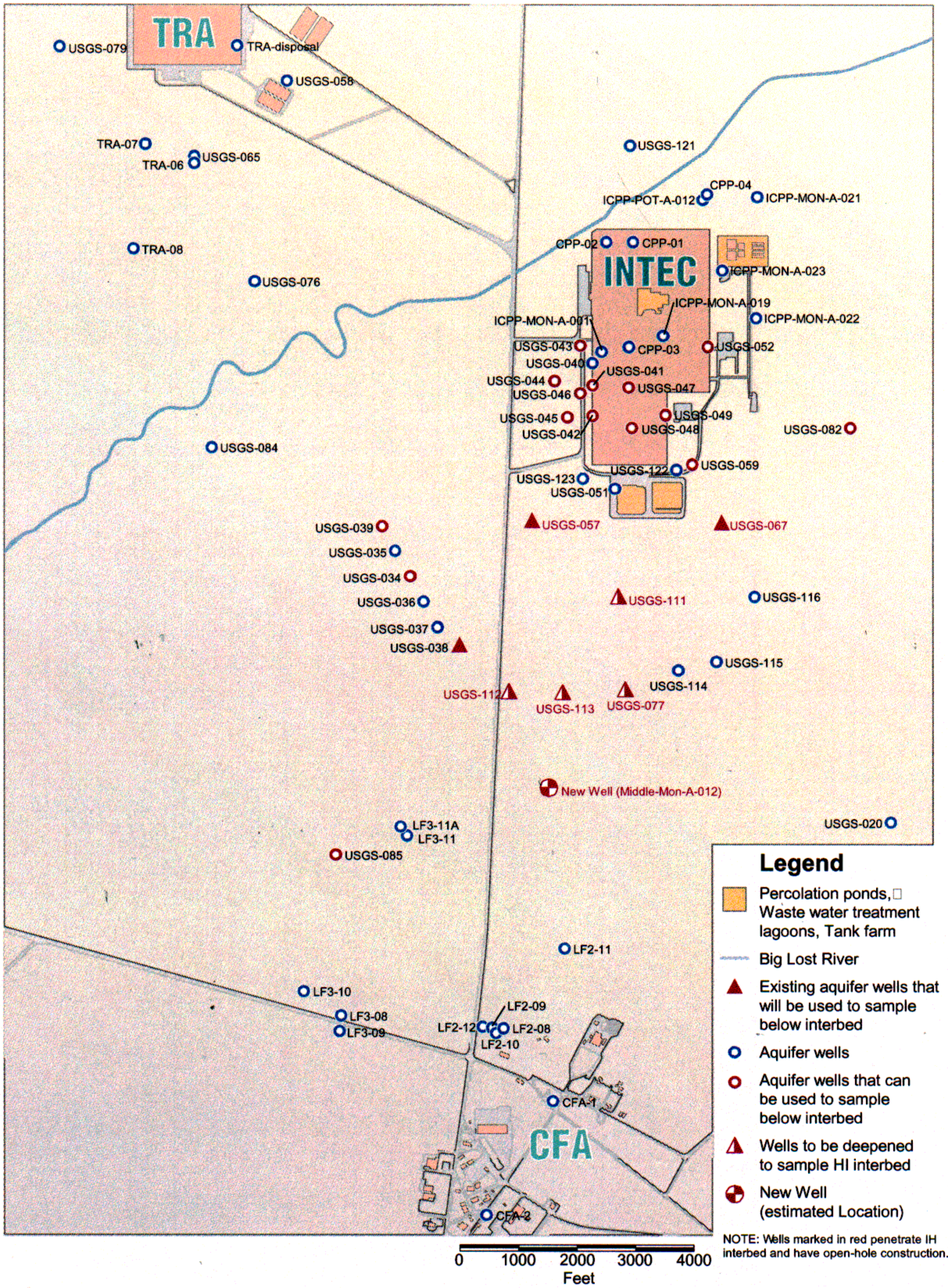


Figure I-1. Locations of monitoring wells to be deepened to sample HI interbed and location of new well.

Table I–2. Potential general project hazards.

Hazard	Applicable	OSHA/DOE Standard	Routine/Significant
High Voltage (>600 V)	Yes	29 CFR 1910.308(a), .304(f)(7), .303(h)(2), .303(h)(3), .303(h)(4)	Routine
Flammable gases, liquids, or dust	Yes	29 CFR 1910.106, .120, .144, .1200; 29 CFR 1926.152	Routine
Compressed gases	Yes	29 CFR 1910	Routine
Explosive materials	No	NA	NA
Cryogens	No	NA	NA
Inert and low-oxygen atmospheres (confined spaces)	No	NA	NA
Chemical exposures	No	NA	NA
Nonionizing radiation	No	NA	NA
High-intensity magnetic fields	No	NA	NA
High noise levels	Yes	29 CFR 1910.95, .1200; 29 CFR 1926.52	Routine
Mechanical and moving equipment	Yes	29 CFR 1910.147, .211; 29 CFR 1926, Subpart W	Routine
Working at heights	Yes	29 CFR 1910.25, .28; 29 CFR 1926.951, .451	Routine
Excavation	No	NA	NA
Material handling	Yes	29 CFR 1910.120, .176, .178, .184; DOE-STD-1090-96, "Hoisting and Rigging"	Routine
Aircraft collision	No	NA	NA
Pesticide use	No	NA	NA
High temperature (>125°F on contact or >202°F) and pressure (>25 psig for gas or vapor, or >200 psig for a liquid system)	Yes	29 CFR 1910.120, .1200	Routine
Inadequate illumination	No	NA	NA
Radiological hazardous materials	No	NA	NA
Nuclear criticality	No	NA	NA
Direct radiation	No	NA	NA
Construction	Yes	29 CFR 1926	Routine
Pyrophoric metals	No	NA	NA
Natural phenomena - floods, volcanic activity, earthquakes, etc.	No	NA	NA

4. CONCLUSIONS

4.1 Hazard Classification

Based on the information presented above, the hazard classification of the OU 3-13 groundwater monitoring well drilling project is determined to be "other industrial." No releasable quantities of hazardous or radioactive materials have been identified, therefore, this project will not present significant, non-routine concerns to the workers, the public, or the environment. There are no general project hazards that have been identified as "significant," therefore, no further analysis is required. Those general project hazards that have been identified as "routine" will be addressed and administratively controlled through the project health and safety plan (Appendix G to this report).

5. REFERENCES

1. 40 CFR 302, July 1999, "Designation, Reportable Quantities, and Notification," *Code of Federal Regulations*, Office of the Federal Register.

2. DOE Order 5480.23, *Nuclear Safety Analysis Reports,* U.S. Department of Energy, March 10, 1994.

3. DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* Change Notice No. 1, U.S. Department of Energy, September 1997.

4. DOE-EM-STD-5502-94, *Hazard Baseline Documentation,* U.S. Department of Energy, August 1994.

5. DOE-ID N 420.Al, *Safety Basis Review and Approval Process,* U.S. Department of Energy, Idaho Operations Office, May 1998.

6. INEEL, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 the INEEL - Part A, RI/BRA Report (Final),* DOE/ID-10534, U. S. Department of Energy, Idaho Operations Office, November 1997.

7. INEEL, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13,* DOE/ID-10660 Revision 0, October 1999.

Appendix J

Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites

DOE/ID-10587 Revision 6

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific
"Stand Alone" document number

Appendix K

Spill Prevention/Response Program

Appendix K

Spill Prevention/Response Program

Any inadvertent spill or release of potentially hazardous materials (such as equipment fluids) will be subject to the substantive requirements contained in the INEEL Emergency Plan/RCRA Contingency Plan Implementing Procedures manual (PLN-114). The Table of Contents for the companywide plan, PLN-114, plus the Table of Contents and Addendum 2 for the Idaho Nuclear Technology and Engineering Center PLN-114-2, are attached.

Handling of the material and/or substance shall be in accordance with the recommendations of the applicable material safety data sheets, which will be located at the project site(s). In the event of a spill, the emergency response plan outlined in the project HASP will be activated. All materials/substances at the work site shall be stored in accordance with applicable regulations in approved containers.

INEEL Emergency Plan/ RCRA Contingency Plan INTEC	TABLE OF CONTENTS	Identifier: PLN-114-2 Revision: 90 Page: 4 of 4

CONTENTS

FIGURES

TABLES

G1. RELEASE, SPILL, OR LEAK OF HAZARDOUS MATERIAL

G1.1 General

Hazardous chemicals and fuel in various quantities are used and stored throughout the Idaho Nuclear Technology and Engineering Center (INTEC). Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) low-level radioactive, mixed low-level radioactive, Toxic Substances Control Act (TSCA) polychlorinated biphenyl (PCB), hazardous, and/or special case waste will be disposed outside the INTEC facility fence at the Idaho National Engineering Environmental Laboratory (INEEL) CERCLA Disposal Facility (ICDF) complex. This complex includes the Storage, Sizing, Staging, and Treatment Facility (SSSTF) with administration and decontamination buildings and associated units, storage/staging pads, an evaporation pond with two cells, one landfill disposal cell, leachate collection system and associated equipment.

Substances could be released (a) during an accident involving handling of the substances; (b) as a result of a more general emergency, such as a fire, explosion, or tank failure; or (c) pipeline valving that has deteriorated. A list of hazardous chemicals handled or stored in an area is included as appropriate in facility-specific information for that area. The lists specify the maximum quantity of material allowed, although typical quantities may be significantly less. Personnel are trained to consult these lists, appropriate material safety data sheets, and appropriate emergency response procedures before approaching any area or accident involving a chemical leak or spill.

If an emergency or response to a hazardous material is necessary that requires the use of Level A personal protective equipment (PPE), the emergency action manager directs activation of the Incident Response Team (IRT), if available. The emergency action manager may request additional assistance from the INEEL HazMat Team as needed.

NOTE: *IRT will use the buddy system and have a minimum of two backup personnel ready in appropriate levels of PPE, if rescue is needed.*

All other personnel evacuate the immediate area. Personnel outside of that area remain at their stations unless otherwise directed by a voice paging announcement. The evacuation of a large area or entire building is unlikely due to the localized use of hazardous materials. However, standard evacuation practices would be used if such evacuation is appropriate for a specific accident.

G1.2 Radiological

A release of radioactive material could cause wide spread contamination over a large area of INTEC. This could occur as a result of a fire or explosion in a radioactive materials container. Leaks of a radioactive vapor may cause similar contaminations as particles in the vapor settle.

G1.3 Nonradiological

Nonradiological chemicals used throughout INTEC could result in a hazardous situation in which personnel might come in contact with the hazardous chemical. Much care must be given when responding to or cleaning up the spill or leak so that IRT members do not endanger their own or other lives. A planned procedure must be followed so additional emergency situations can be avoided.

G2. ACTIONS TO BE TAKEN IN RESPONSE TO A RELEASE, SPILL, OR LEAK

Certain steps need to be followed when dealing with any chemical spill or leak that is encountered, although the actual extent of the actions taken will be dictated by the specifics of the release, which would include the nature, volume, and location of the release. The following steps must be taken by operations and/or emergency response personnel in dealing with any release.

1. If the release involves a flammable/combustible liquid, contact the fire department (call 777) immediately.

2. Assist any employees that have been exposed to the release, or have suffered an injury, in receiving proper first aid and/or immediate medical attention. If exposed to the release by direct contamination, then decontamination should be accomplished as applicable.

3. Take steps to secure the area to prevent inadvertent exposure to the release or release byproduct (vapor or gases) by other personnel. Use safety rope and/or signs or direct personnel to remain stationed in certain locations.

4. Contact the immediate job supervisor, the building Tenant Manager, the plant shift supervisor, the Radiation Controls (Radcon) supervisor, the INTEC environmental support supervisor, and the Environment, Safety, and Health (ES&H) manager. These notifications are important, especially for obtaining guidance to handle the incident properly.

5. Obtain proper personnel protective equipment to control, clean up, and dispose of the released material as directed by industrial safety, material management, and environmental assurance personnel. The type of protective clothing and other

equipment required will be delineated on a required hazardous work permit. If the material released is radioactive, contact a Radcon supervisor as well as industrial safety personnel. Handling of radioactive materials will require a radiation work permit. When details regarding the release are not available, a conservative approach is mandatory: air-supplied respiratory equipment and full-body protective clothing must be worn. Medical monitoring will be accomplished prior to entering a hazardous materials environment when wearing Level A or B protective clothing. The buddy system will be in place along with a minimum of two backup personnel dressed in the same level of protective gear.

6. Take steps to control the release. This may involve shutting certain valves, diking the area (e.g., use sandbags, berms, or spill-control pillows), and/or applying an absorbent or neutralizing compound directly to the release. It is important, when utilizing an absorbent or neutralizing compound, that an appropriate product is utilized that will not have an unwanted chemical reaction, which could produce a more hazardous situation. Industrial and INTEC environmental support personnel will specify the product to be used to absorb or neutralize the released material; if radioactive, contact a Radcon supervisor.

7. Conduct the clean-up, storage and/or disposal of the waste under the direction of industrial hygiene, environmental support, and, if the waste is radioactive, a Radcon supervisor. However, the treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material resulting from a release, fire, or explosion immediately after the emergency, shall be accomplished by methods approved only by the INTEC environmental support supervisor. Ensure that incompatible wastes are not treated, stored, or disposed of in the affected areas before cleanup procedures have been completed.

8. Clean all emergency equipment used in the affected area and restore the equipment to its ready condition, fit for its intended use. Equipment or protective clothing that cannot be suitably cleaned and returned to service shall be replaced by clean, equivalent equipment. Obtain the assistance of Industrial Hygiene and environmental support personnel for proper disposal of the used equipment and protective clothing.

9. Ensure that all reporting requirements and forms are completed.

For all situations, it is recommended that conservative actions be taken that assume a worst-case situation to ensure that (a) personnel are not exposed to the chemical release or to possible byproducts of the release, (b) physical damage to the facilities is kept to a minimum, and (c) no environmental hazards are created. Additionally, in the event facility operations are shut down in response to a fire, explosion, or hazardous material release, affected process or facility equipment or components should be monitored for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, vessels, or other equipment.

G2.1 Remedial Actions for Leaking Process Components and Other Equipment

The remedial action plans for leaking processes (pipes, valves, tanks, etc.) at INTEC is outlined below and is broken down into three specific cases depending on the type of leak discovered.

G2.1.1 Leakage From/Without Secondary Containment

This category involves direct leakage to the environment due to failure of secondary containment or the absence thereof. In this event, the following actions will be required:

1. If the solution is known or can be proven to be nonhazardous, no specific controls are required. Appropriate mitigative steps will be taken to minimize the extent of the leak.

2. If the solution is hazardous or if its hazardous nature is unknown, the following steps will be required.

   a. Immediately notify senior management.

   b. Take prompt measures to minimize the amount of solution reaching the environment. These actions should be initiated immediately and shall include taking the failed tank or other equipment out of service and, if possible, transferring the contents of the leaking tank to another tank.

   c. <u>When the release equals or is in excess of reportable quantities</u>, the full requirements of the plan shall be in effect. If such is the case, the release must be reported to the Warning Communications Center (6-1515), the Environmental Protection Agency (EPA) Regional Administrator, the State of Idaho, and other local authorities.

   However, any leak, release, or structural defect to an interior wall embedded waste line penetration (which may affect secondary containment integrity) requires immediate notification of Regulatory Affairs. Notification of Department of Energy Idaho Operations Office (DOE-ID) must occur within 12 hours of detection for lines granted secondary equivalency.

The line must be taken out of service within 24 hours of detection. DOE-ID must notify the State of Idaho within 24 hours of detection.

d. If the release is less than the reportable quantities, the plan may be partially implemented in response to the release. Additionally, the spill may be required for inclusion in Superfund Amendments and Reauthorization Act of 1986 (SARA) reports.

3. If the leak was from a failed secondary containment, the system will be repaired or otherwise operated in such a manner to ensure no environmental releases are possible prior to use of the tank or equipment. If the leak was from primary containment, without a secondary containment system, a secondary containment system will be provided prior to subsequent use.

4. If the leakage is later found to be nonhazardous, when it was originally conservatively assumed to be hazardous, the steps outlined above are not necessary.

G2.1.1 Leakage From Primary To Secondary Containment (High Integrity)

In this case, leakage is to a secondary containment system that meets applicable criteria of compatibility with the waste and adequate protection against the potential for leakage to the environment. Once leakage is detected, the following actions will be required:

1. If the solution is known or can be proven to be nonhazardous, no specific actions are necessary provided the amount of leakage, if not removed from secondary containment, will not impair the ability of the leak detection mechanism to detect future leaks.

2. If the solution is or might be hazardous, the following steps will be required:

   a. Immediately notify senior management.

   b. Take prompt measures to minimize the amount of solution reaching the secondary containment. This could include a variety of actions such as isolation, transfer to a parallel tank, etc.

c. Evaluate the physical characteristics of the leak. Attempt to identify the source of leakage, the amount or rate of leakage, composition of the solution, etc.

d. If the leak cannot be repaired remotely and other conditions such as high-radiation fields prohibit a direct hands-on repair effort, appropriate personnel will be convened to determine the proper course of action. As a minimum, representatives from INTEC Environmental Support, Industrial Hygiene, and the department responsible for the affected system will be notified. The type of corrective action will consider the severity of the leak and the actions necessary for repair. The evaluation will consider the leak rate, composition of the solution, radiation exposures necessary for repair, the extent of decontamination required to complete repair and other pertinent factors. Under no circumstances will the leakage be permitted to threaten the environment. The amount of leakage, if allowed to persist, must be sufficiently small that it will not prevent the leak detection mechanism from functioning. Furthermore, the leakage will be removed from the secondary containment and stored or disposed of in accordance with established procedures.

3. The following corrective actions will be considered for selection:

   a. Shut down the affected system and repair the leak immediately.

   b. Shutdown the affected system and initiate actions to prevent further leakage before reuse. Evaluate system repair during the next available maintenance turnaround.

   c. Continue operation with additional controls to minimize the amount of leakage. Evaluate system repair during the next available maintenance turnaround.

4. The course of action taken will be documented and justified with approval of senior management. Any surveillance activities for previously identified leaks will evaluate any changes to the amount or type of leakage. If leakage worsens, additional corrective actions and evaluations will be made. These actions will likewise be documented and approved by senior management.

5. Leakage that does not enter the environment will not require formal spill reporting to the EPA or the State of Idaho but may be required

for inclusion in SARA reports. Proper documentation regarding all key aspects of the leak should be well organized and auditable.

However, any leak, release, or structural defect to an interior wall embedded waste line penetration (which may affect secondary containment integrity) requires immediate notification of environmental compliance. Notification of DOE-ID must occur within 12 hours of detection for lines granted secondary equivalency. The line must be taken out of service within 24 hours of detection. DOE-ID must notify the State of Idaho within 24 hours of detection.

G2.1.2 Leakage From Primary To Secondary Containment (Limited Integrity)

In this category, leakage is to a secondary containment that does not meet applicable criteria of compatibility with the waste or adequate protection against the potential for leakage to the environment. If leakage of this type is detected or suspected, the following actions will be required:

1. If the solution is known or can be proven to be nonhazardous, no specific actions are necessary provided the amount of leakage, if left in the secondary containment, will not impair the ability of the leak detection mechanism to detect future leaks.

2. If the solution is or might be hazardous, the following steps will be required:

    a. Immediately notify senior management.

    b. Take prompt measures to minimize the amount of solution reaching secondary containment. A variety of appropriate corrective actions could be utilized but must include taking the failed system out of service.

    c. Ensure the solution is removed from the secondary containment before the time interval for compatibility is exceeded.

    d. If previous corrective actions have not completely stopped the leak, or allowed removal of the leakage from secondary containment, the leak will be treated as a release to the environment and handled in accordance with applicable guidelines.

e. If previous corrective actions completely stopped the leak and the leaked solution was promptly removed such that no environmental release resulted, a specific evaluation will be conducted. This evaluation will be held in conjunction with the DOE-ID to determine the proper course of action. This evaluation must be completed prior to returning the system to operation.

However, any leak, release, or structural defect to an interior wall embedded waste line penetration (which may affect secondary containment integrity) requires immediate notification of environmental compliance. Notification of DOE-ID must occur within 12 hours of detection for lines granted secondary equivalency. The line must be taken out of service within 24 hours of detection. DOE-ID must notify the State of Idaho within 24 hours of detection.

G3. SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

INTEC Persons with SPCC Plan Responsibilities

M. J. MacConnel Michael A. MacConnel — 6/3/2002
Phone: 526-1167 Signature — Date
Pager: 6960

K. L. Miller K L Miller — 6-3-02
Phone: 526-9733 Signature — Date
Pager: 5336

Approval

ES&H Manager, INTEC

C. R. Jones Corrinne Jones — 6-3-02
Phone: 526-8079 Signature — Date
Pager: 5728

Area Director, INTEC
The Spill Prevention, Control, Countermeasures Plan will be implemented as herein described:

R. R. Chase Riley Chase — 6/3/02
Phone: 526-0018 Signature — Date
Pager: 5669

Certification

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR 112, attest that this plan has been prepared in accordance with good engineering practices.

CLINTON O. KINGSFORD
Printed Name of Registered Professional Engineer

Clinton Kingsford
Signature of Registered Professional Engineer

6·03·02 — Date
2104 — Registration Number
IDAHO — State

PROFESSIONAL ENGINEER-LAND SURVEYOR
REGISTERED
2104
6·03·02
STATE OF IDAHO
CLINTON O. KINGSFORD

G3.1 General Information

G3.1.1 Regulatory Background

This Spill Prevention, Control, and Countermeasures (SPCC) Plan has been prepared in accordance with 40 Code of Federal Regulations (CFR) 112, Oil Pollution Prevention. It addresses both aboveground and underground oil storage containers, including electrical transformers with 660 gal or more of oil, at the INEEL INTEC.

In accordance with *40 CFR 112.1*(a.), the purpose of this SPCC plan is to establish requirements "to prevent the discharge of oil, through a spill event, from nontransportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines." A spill event is defined as a release of enough oil to navigable waters of the United States to violate applicable water quality standards, to cause a film or sheen on or discoloration of the water or adjoining shorelines, or to cause a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines [40 CFR 110.5 (a) and (b)].

G3.1.2 Facility Description

1	Name of facility	Idaho Nuclear Technology and Engineering Center (INTEC) (see Figure G1).
2	Type of facility	Receive and store spent nuclear fuel and prepare it for final disposition. Dispose of CERCLA low-level and/or mixed low-level radioactive waste.
3	Location of facility	Approximately 2 mi north of the Central Facilities Area.
4	Name of owner	U.S. Department of Energy.
5	Address of owner	U.S. Department of Energy Idaho Operations Office 785 Department of Energy Place Idaho Falls, ID. 83401-1562

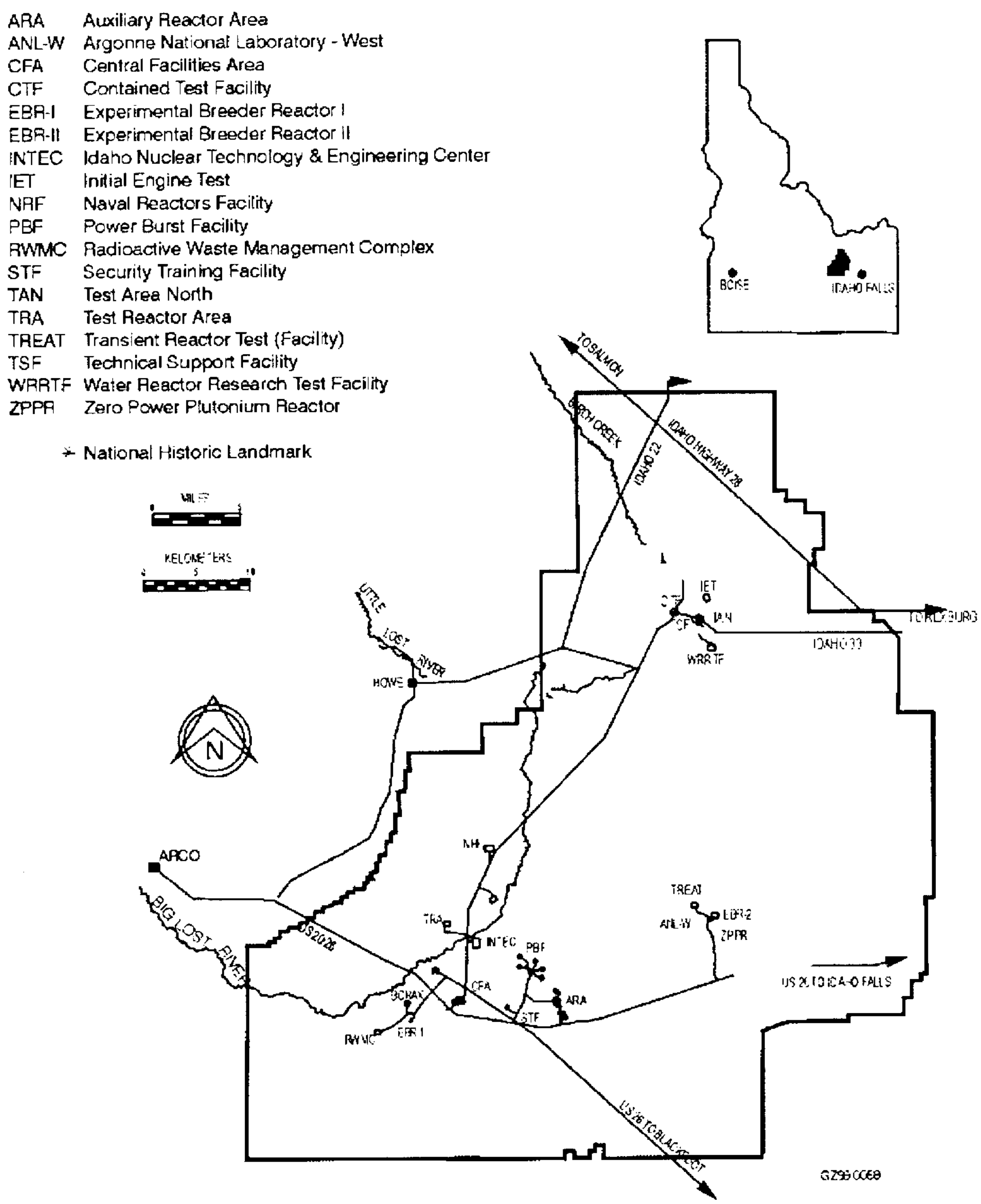


Figure G1. Location of the INTEC within INEEL boundaries.

The INTEC is one of the principal facilities at the United States Department of Energy's (DOE) INEEL, located approximately 50 mi west of Idaho Falls and north of State Highway 20 (see Figures G1 and G2). INTEC began operation in 1953. INTEC's original mission was to receive, store, and reprocess spent nuclear fuel from test and research reactors in the United States and foreign countries, including the U.S. Navy's ship propulsion reactors. In 1992, INTEC's mission was changed to receive and store spent nuclear fuel and prepare it for final disposition. Construction of the ICDF complex began in 2001. The ICDF complex is designed to function as an INEEL site wide disposal facility to accommodate receipt, staging, storage, treatment, and disposal of soil debris and liquid waste generated from CERCLA activities.

The INTEC is located on relatively flat terrain (less than 1% grade with localized depressions) made up of poorly sorted gravel and gravely, coarse sand with abundant well-rounded small cobbles and traces of silt and clay, most of which has been disturbed and replaced with gravel. The gravel acts as a natural velocity dissipation control for surface flows. The Big Lost River is an intermittent stream that terminates into a local playa. In wet years, it can flow year round. In dry years, it may not flow at all in the vicinity of INTEC.

G3.2 Spill Events

The INTEC has never discharged more than 1,000 gal of oil into or upon navigable waters of the U.S. in a single spill event or discharged oil in harmful quantities as defined in *40 CFR 110* into navigable waters of the U.S.

G3.3 Oil Storage Capacity

Table G3.3.1 lists the aboveground storage tanks (ASTs) and Table G3.3.2 the underground storage tanks (USTs) at INTEC that are subject to SPCC regulations.

Table G3.3.3 lists those transformers at INTEC that are subject to SPCC regulations. Based on a teleconference with EPA Region X personnel, only electrical equipment with a capacity of 660 gal or greater needs to be addressed in an SPCC plan.

Table G3.3.1. Aboveground storage tanks.

Location	Tank	Content	Gallons	Status	Comments
E of CPP-701	VES-UTI-681	#2 fuel oil	244,000	Active	Boiler fuel
E of CPP-701	VES-UTI-682	#2 fuel oil	57,000	Active	Boiler fuel
S of CPP-1682	VES-KRS-100	kerosene	10,000	Active	Replaced VES-WDS-100 and -101
S of CPP-1682	VES-KRS-101	kerosene	10,000	Active	
S of CPP-702	VES-WDS-100	kerosene	20,000	Active	Storing fuel for CFA buses
S of CPP-702	VES-WDS-101	kerosene	20,000	Active	Storing fuel for CFA buses
N of CPP-644	VES-PHE -102	diesel	3,000	Active	CPP-644 standby generator
N of CPP-775	VES-CFG-6011	#2 fuel oil	1,500	Active	CFSGF, boilers
CPP-687	VES-CFG-6022	#2 diesel	275	Active	GEN-CFG-001 standby generator day tank
CPP-1642	VES-UTI-113	diesel	560	Active	Diesel, firewater pump fuel
CPP-1643	VES-UTI-114	diesel	560	Active	Diesel, firewater pump fuel
CPP-614	VES-UTI-620	diesel	300	Active	Diesel, raw water pump fuel
CPP-637	VES-YDC-105	kerosene	500	Active	Pilot plant experiments
CPP-1749	VES-YDA-107	diesel	165	Active	Diesel, water pump fuel
CPP-644	VES-UTI-656	diesel	50	Active	CPP-644 standby generator day tank
CPP-616	VES-UTI-168	diesel	180	Active	Standby plant air compressor
CPP-1684	VES-WCS-103	#2 diesel	240	Active	Emergency generator day tank
		Total:	367,815		

Table G3.3.2. Underground storage tanks.

Location	Tank	Content	Gallons	Status	Comments
SE cor. of CPP-659	VES-NCE-140-1	diesel	5,000	Inactive	Standby generator
SE cor. of CPP-659	VES-NCE-140-2	diesel	5,000	Inactive	Standby generator
S of CPP-1684	VES-WCS-106	#2 diesel	10,000	Active	Standby generator
S of CPP-660	VES-SAA-152	diesel	2,500	Active	Gas Boy pumps
S of CPP-660	VES-SAA-153	gasoline	5,000	Active	Gas Boy pumps
		Total:	17,500		

Table G3.3.3. Transformers 660 gallons or greater.

Location	Transformer	Content	Gallons	Status	Comments
B21-620 substation	6-073	oil	6,400	Active	No PCBs
B21-620 substation	6-074	oil	6,400	Active	No PCBs
		Total:	12,800		

G3.4 Oil Flow Direction and Facility Drainage

Figure G2 shows the surface drainage flows at INTEC. The nearest waters of the U.S. is the Big Lost River (BLR), which is outside the northwest corner of the facility.

Except under extreme conditions, all INTEC drainage is retained at the facility. The facility is currently surrounded by a stormwater drainage system with discharges to an abandoned gravel pit located on the East Side. The pit can contain approximately 400,000 ft^3 of liquid. There is no record of the pit ever filling to the point of overflow. Water that accumulates in the pit either evaporates or infiltrates. The pit is located approximately 2,000 ft from the Big Lost River and is separated from the river by a large vegetated natural basin and a large dike running along the riverbank. On the northeast side of the basin, culverts cross under an elevated railroad dike and enter another natural basin. The dike along the river stops in this basin and, therefore, there is a remote potential of a discharge from this basin to the Big Lost River from this basin during extreme conditions.

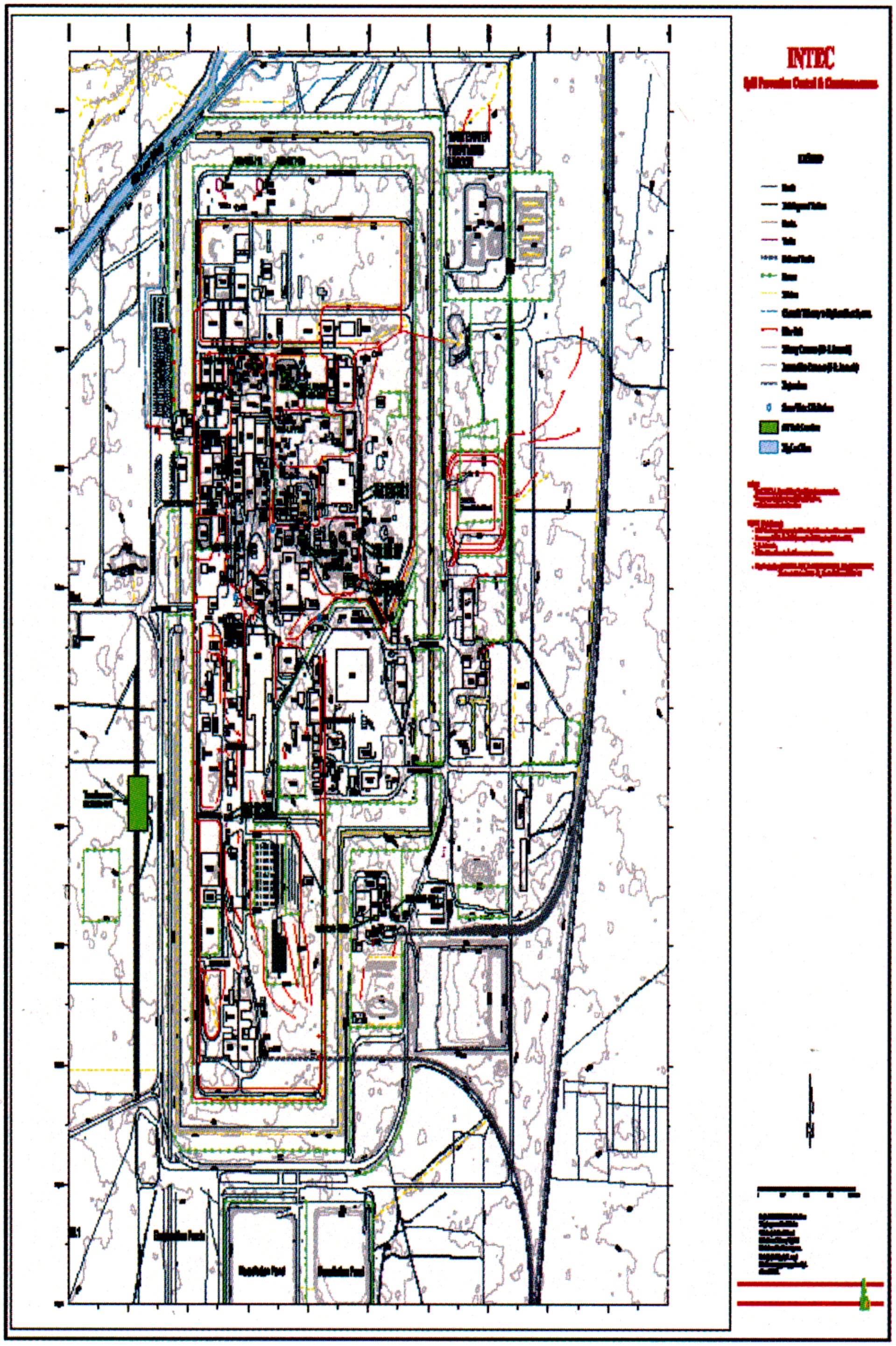


Figure G2. INTEC facility map.

However, excluding the manmade features (i.e. pit, dike, railroad tracks, ditches, etc.), there may be a potential for oil to reach the Big Lost River in the event of a spill if it coincided with a worst-case runoff event.

Aboveground CPP-701 storage tanks VES-UTI-681 and VES-UTI-682 contain the bulk of the total oil stored at INTEC and are the greatest potential source for a major oil spill. The storm water drainage system at INTEC, including the area around the CPP-701 fuel oil storage tanks, is currently being upgraded. The upgrade consists of lining the drainage ditches in a large area of INTEC with concrete and constructing a 1.26 million ft^3 evaporation pond double lined with a geotextile (polypropylene) liner. The pond is designed to store a 25-year worst-case snowmelt event and is equipped with two gated outlet culverts that are placed at the upper elevation of the pond. The gates will allow draw down of the pond level as needed and also could be used to prevent discharge from the pond in the event of an oil release to the pond. This pond is also located on the East Side of the facility next to the existing pit currently being used. Drainage from the pond outlet will also follow the same flow path to the Big Lost River as previously described for the existing drainage system. Construction for this drainage upgrade is underway, however, due to funding uncertainties, a completion date for this project is uncertain.

The drainage system at the Coal-Fired Steam Generation Facility (currently not in operation), which contains tanks VES-CFG-6011 and -6022, consists of a trench surrounding the north area of the facility and part of the INTEC drainage system on the west and south sides of the facility. The trench around the north area is designed to contain a 10-year, 24-hour rainfall event.

G3.5 Oil Spill Containment and Diversionary Structures and Equipment

Containment and diversionary structures are provided to prevent discharged oil from reaching a navigable water course.

All ASTs, with the exception of VES-UTI-168, have some form of secondary containment. Tank VES-UTI-168 is located east of building CPP-616 and does not have secondary containment. However it does have a spill pan to collect leaks and small spills. Tanks VES-UTI-102, VES-CFG-6011, VES-KRS-100, and VES-KRS-101 have leak detection and associated alarm systems. All other AST secondary containments are checked once a shift for leaks in accordance with Conduct of Operations Procedure, Chapter II, *Shift Routines and Operating Practices* (MCP-2974).

The CPP-701 aboveground storage tanks (VES-UTI-681 and -682) are contained within a 10-ft high earthen berm that has sufficient capacity to contain the contents of the largest single tank plus sufficient freeboard to allow for precipitation, or the entire contents of both tanks should they rupture simultaneously.

Tanks VES-WDS-100 and -101 are surrounded by an earthen berm designed to contain the contents of one tank. These tanks are 20,000 gal capacity each, but presently contain approximately 3,900 gal of kerosene each. These tanks are currently out of service and there are no plans for future use. Tanks VES-KRS-100 and -101 are carbon steel tanks built within a concrete vault, constructed in 1996. The vault can hold 110% of one tank. The vault also has local and remote leak detection alarms to indicate when a leak occurs.

Tanks VES-PHE-102 and VES-CFG-6011are constructed of single-wall carbon steel and seated within individual concrete vaults designed to hold 110% of tank contents. VES-PHE- 102 provides fuel for the standby generator located in CPP-644. VES-CFG-6011 provides fuel for the standby generator at the Coal Fired Steam Generation Facility. VES-UTI-620, 300 gal, is constructed of steel and is situated in a concrete vault. VES-UTI-620 is located inside CPP-614. VES-UTI-113 and -114, both 560 gal, are also steel tanks situated above concrete vaults. VES-UTI-113 is located inside CPP-1642 and VES-UTI-114 is located inside CPP-1643. VES-YDC-105 is steel tank enclosed in concrete (Convault design) with interstitial monitoring. VES-YDA-107, 165 gal, is constructed of steel and is surrounded by a curbed area. The curbed area will hold 215 gal. VES-YDA-107 is located inside CPP-1749.

VES-UTI-656 is a 50 gal steel tank located inside CPP-644, VES-WCS-103 is a 240 gal steel tank located inside CPP-1684, and VES-CFG-6022 is a 275 gal steel tank located inside CPP-687. These are day tanks for associated standby generators. The buildings act as secondary containment for these tanks.

The diesel powered standby plant air compressor is located east of building CPP-616. This compressor has a 180 gal diesel fuel tank (VES-UTI-168), which is an integral part of the compressor. A small spill would be contained in the drip pan; however, larger spills could reach the environment.

All USTs have double containment and are equipped with interstitial leak detection in the interstitial area. If a leak occurs, it would be contained by the secondary liner. Repairs would include removal of the tank to either repair the primary liner or replace the tank.

Underground storage tanks VES-NCE-140-1 and -2 once contained diesel fuel for NWCF standby generators. These tanks are double-wall fiberglass-reinforced plastic (FRP) and were installed in 1995 to comply with *40 CFR 280* UST regulation upgrades. Each tank has a capacity of 5,000 gal with interstitial leak detection. These tanks are now inactive and the fuel has been transferred to a replacement tank, VES-WCS-106. This UST is a 10,000 gal, double wall, fiberglass tank with interstitial monitoring and float switch monitoring for overfill protection. This tank will now provide fuel for the three standby generators located in CPP-1684.

Tank VES-SAA-152 is a 2,500 gal FRP double contained tank. It contains diesel for vehicle refueling. It was installed in 1995 as part of the INTEC tank upgrade project to meet *40 CFR 280* UST requirements. The tank has interstitial monitoring that alarms when any leakage is detected. Tank VES-SAA-153 is a 5,000 gal FRP double contained tank. It contains gasoline fuel for vehicle refueling. It was installed the same time as VES-SAA-152 in 1995 to comply with the UST regulations. It also has interstitial monitoring to detect any leaks from the primary containment tank with local leak detection alarm.

The two electrical transformers of concern listed in Table G3.3.3 are located in substation yards with deep gravel bases, which can hold the contents of the largest single transformers. Oil in these transformers contain no PCBs.

INTEC is completely surrounded by a storm water drainage system that does not discharge to waters of the United States. In the unlikely event that oil entered this drainage system, it would be contained within the system.

G3.6 Miscellaneous Control Measures

Catch pans are placed under the fill connections to prevent spills when oil is unloaded from the delivery trucks (INTEC TPR-P9.3-D8). USTs have spill control cabinets inside the building of the equipment they feed. The Gas Boy dispensing pumps at CPP-660, which feed from UST VES-SAA-152 and -153, also have spill control equipment in case of a spill.

G3.7 Fail-Safe Engineering

The material and construction for all tanks at INTEC are compatible with the materials stored. All tanks levels can be monitored through manual probing, external direct vision fuel level indicators, and/or electronic liquid level sensing devices. The type of containment for each tank has been described previously as well as the response to any leak detection.

Tanks VES-KRS-100 and VES-KRS-101 also have high-level alarms for protection against overflow. These alarms also alert Operations personnel of piping or tank failure because they are also triggered when low-level conditions are present. All fill pipes and ports are protected from traffic by either guards or distance.

All utility areas are inspected each shift by Utility Operations as required by Conduct of Operations procedures.

All newly installed buried pipelines have protective coatings or cathodic protection, or are sleeved for secondary containment.

Traffic at the INTEC facility is limited because of the high degree of security at the facility. No overhead piping systems are outside of buildings exposed to traffic and those systems located inside buildings are designed with sufficient clearance that there is no risk of collision with utility or transport vehicles.

Gasoline and diesel Gas Boy dispensers have high alarms on their storage tanks, which activate at 95% full.

The fuel delivery trucks have pressure sensitive cut-off nozzles, which shut off the fuel flow when the tank is full.

INTEC TPR-P9.3-D8 provides instructions for operating the fuel oil and diesel fuel storage and supply system. This procedure includes steps for receiving and unloading fuel oil, diesel fuel, and emergency actions in the event of a leak, spill, or tank overfill.

G3.8 Wastewater Effluent

The wastewater system at INTEC is sufficiently tight that it is not plausible that oil could enter the system.

G3.9 Correction Of Oil Leaks

INTEC has a work control maintenance program to ensure that oil leaks are corrected promptly upon discovery. Work order control is accomplished by STD-101, Integrated Work Control Process.

G3.10 Portable/Temporary Tanks

Portable/temporary oil storage tanks may be brought onto the facility and covered under this SPCC plan if the owner/operator of the tank submits and obtains approval of form 435.33 from the facility's responsible SPCC person (see page G11). The approved form is to be maintained at the facility with the facility SPCC plan.

G3.11 Spill Response

Should a spill occur, the facility needs to follow the *INEEL Emergency Plan/RCRA Contingency Plan*, which describes measures to be taken to prevent, control, and clean up any chemical or oil spills at the facility. The emergency action manager needs to respond also to requirements in MCP-190, Occurrence Reporting and MCP-3480, Environmental Instructions for Facilities, Processes, Materials and Equipment. One of the primary goals of the response action is to prevent discharged oil from reaching waters of the U.S. and causing other damage or injury. Copies of the *INEEL Emergency Plan/RCRA Contingency Plan* are maintained and are to be used in conjunction with this SPCC Plan.

The general procedure for oil spill response is as follows:

1. Control the spill at the source.
2. Identify the area of the spill.
3. Secure the area of the spill.
4. Quantify the spilled material using one or more of the following methods:
    a. Subtract volume in the tank after the spill from volume before the spill.
    b. Quantify amount of spilled material recovered.
    c. Measure or estimate dimensions of spilled area.
    d. Any other method appropriate for quantifying the spill.
5. Report spill to the plant shift supervisor (PSS). This report should include the following spill information:
    - Time
    - Location
    - Material
    - Quantity
    - Source
    - Cause
    - Release area.

The INEEL Spill Notification Team (SNT) at Pager number 6400 must be contacted promptly. It is the plant shift supervisor's responsibility to ensure that the SNT is contacted, and to assist them in making the correct notifications. Depending on the source, volume, and location of the spill, notifying several persons and agencies may be necessary.

None of the containment areas (i.e., berms or buildings) has valves that enable drainage from the containment; therefore, personnel respond to a spill by either using sorbent materials to absorb the spillage or pumping the spillage depending on circumstances. Contaminated materials, including soil, resulting from the spill are disposed in accordance with applicable state and federal regulations.

G3.12 Tank Truck Loading and Unloading

Oil loading and unloading operations from tanker trucks to ASTs or USTs do not occur in contained areas. Most of the refueling areas are on gravel, dirt, or paved surfaces. Levels in tanks are checked before filling begins. Truck drivers are to monitor the vehicle continually while off-loading to ensure that no leaks are coming from valves, fuel transfer lines, etc. Tanks are not to be filled beyond the 90% level to avoid overfilling and ensure adequate air space for fuel expansion.

As part of the drainage upgrade described in Section G3.4 of this plan, the unloading rack area (including hose port fuel pump house, and truck parking area) for CPP-701 has been paved and sloped to provide immediate drainage to an adjacent concrete ditch. The current drainage system and the future upgrades will provide a quick drainage system and containment for tanker truck unloading operations in this area.

G3.13 Inspection and Records

All utility areas and the Coal Fired Steam Generation Facility with ASTs are inspected each shift by Utility Operations as required by Conduct of Operations procedures. The inspection reports are maintained in the Utility Operations records file for a minimum of 3 years.

The other fuel oil ASTs (VES-KRS-100 and -101, VES-WDS-100 and -101, and VES-YDA-107) are inspected each shift by Waste Operations personnel as required by Conduct of Operations. The inspection log is maintained by the Waste Operations department and retained for a minimum of 3 years.

VES-YDC-105 is inspected for chemical usage at a minimum of once every 3 weeks in accordance with MCP-2873, INEEL Chemical Management System (ICMS). ICMS is a chemical inventory used to track chemical usage and also types and locations of chemical containers.

The USTs are equipped with computer systems that monitor various functions. Computer program records are available if needed by contacting the tank owners. Because all the oil carrying USTs at INTEC are fiberglass with double walls, and have internal leak detection, no regular pressure testing for tightness is required.

G3.14 Security

DOE has established physical control procedures and equipment to control access to the INTEC. The INTEC is fully fenced and all entrance gates are locked or guarded at all times. The system follows DOE-ID directives and orders on access control. DOE also operates a personnel clearance program to ensure that all employees are evaluated and cleared. The risk of potential sabotage or planned destruction of a critical operating system is therefore minimal.

In addition to the physical security at INTEC, there are Operations administrative procedures in place to reduce the potential for tank leakage to navigable waters of the United States. Included in these measures are locked and tagged valves, blind flanges when in standby or nonoperational status, authorized access only to pumping facilities, and localized lighting around tank systems to more readily detect spills or acts of vandalism.

G3.15 Personnel, Training, and Spill Prevention Procedures

The Plant Shift Supervisor (PSS) coordinates the daily activities at INTEC and also acts as the emergency action manager during emergency response situations. The PSS can be reached at 6-3100.

Supervisors are responsible to properly instruct their personnel in the operation and maintenance of equipment to prevent discharges of oil. Personnel must maintain an adequate understanding of this SPCC plan, the INEEL Emergency Plan/RCRA Contingency Plan (Addendum 2, Idaho Nuclear Technology and Engineering Center), and be familiar with applicable the pollution control laws, rules and regulations associated with these plans. Spill prevention briefings are to be given periodically to personnel to describe and discuss known spill events or failures, malfunctioning components, and recently developed precautionary measures.

Designated personnel who are accountable for oil spill prevention at INTEC can be found on page G11.

G3.16 Other Regulations

ASTs are regulated primarily by the Occupational Safety and Health Administration, the National Fire Protection Association, and SARA, while USTs are regulated primarily by the EPA. Tanks used for storing heating oil for consumptive use on the premises where stored are exempt from the requirements of *40 CFR 280*. Tanker trucks used for refueling are regulated and in compliance with U.S. Department of Transportation regulations. Petroleum product storage and transfer is regulated by the Storm Water Multi-Sector General Permit for

Industrial Activities (40 CFR 122), which is part of the National Pollutant Discharge Elimination System of the Clean Water Act.

Appendix L

Procedures Relevant to RA Activities

Appendix L

Procedures Relevant to RA Activities

INEEL, **GDE-7003**, "Levels of Analytical Method Data Validation," current issue.

INEEL, **Manual 15B**, *Radiation Protection Procedures*, current issue.

INEEL, **Manual 18**, *Closure Management*, current issue.

INEEL, **MCP-62**, "Waste Generator Services—Low-Level Waste Management," current revision.

INEEL, **MCP-63**, "Waste Generator Services—Conditional Industrial Waste Management," current revision.

INEEL, **MCP-69**, "Waste Generator Services—Hazardous Waste Management," current revision.

INEEL, **MCP-70**, "Waste Generator Services—Mixed Low-Level Waste Management," current revision.

INEEL, **MCP-83**, "Characterization of Low-Level Radioactive Wastes for Disposal at the INEEL," current revision.

INEEL, **MCP-121**, "Areas Containing Radioactive Materials," current revision.

INEEL, **MCP-451**, "Generator Treatment Plans," current revision.

INEEL, **MCP-598**, "Corrective Action System," current issue.

INEEL, **MCP-1141**, "Waste Stream Approval Process," current revision.

INEEL, **MCP-2391**, "Calibration Program," current issue.

INEEL, **MCP-2725**, "Field Work at the INEEL," current issue.

INEEL, **MCP-2811**, "Design and Engineering Change Control," current issue.

INEEL, **MCP-3002,** "Managing Disturbed Soils," current issue.

INEEL, **MCP-3003**, "Performing Pre-Job Briefings and Post-Job Reviews," current issue.

INEEL, **MCP-3448,** "Reporting or Disturbance of Suspected Inactive Waste Sites," current issue.

INEEL, **MCP-3472**, "Identification and Characterization of Environmentally Regulated Waste," current revision.

INEEL, **MCP-3475**, "Temporary Storage of CERCLA-Generated Waste at the INEEL," current revision.

INEEL, **MCP-3480**, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," current revision.

INEEL, **MCP-3562**, "Hazard Identification, Analysis and Control of Operational Activities," current issue.

INEEL, **MCP-3653**, "Well Construction, Modifications, Compliance, and Management," current issue.

INEEL, **PLN-123**, "Materials Control and Accountability Plan for Safeguards," current revision.

INEEL, **PRD-25**, "Activity Level Hazard Identification, Analysis, and Control," current issue.

INEEL, **PRD-5030, a**, "Environmental Requierments for Facilities, Processes, Materials, and Equipment," current issue.

INEEL, **STD-101**, "Integrated Work Control Process," current issue.

INEEL, **TPR-4910**, "Logbook Practices for ER and D&D&D Projects," current issue.

INEEL, **TPR-6565**, "Core Sampling," current revision.

INEEL, **TPR-6566**, "Measuring Groundwater Levels," current issue.

INEEL, **TPR-6572**, "Installing Lysimeters and Sampling Soil Pore Water," current issue.

INEEL, **TPR-6574**, "Decontaminating Heavy Equipment, in the Field," current issue.

INEEL, **TPR-6575**, "Decontaminating Sample Equipment in the Field," current issue.

Appendix M

INEEL Storm Water Pollution Prevention Plan for Construction Activities – Generic Plan

DOE/ID-10425(98)
Revision 2

[The document that is the subject of this appendix was provided as an attachment to the original deliverable.]

To view this Appendix, please see specific "Stand Alone" document number

(**NOTE:** The document number referenced is a "Generic Plan Template" used to build the file, it is not a document)

Storm Water Pollution Prevention Plan
For Construction Activities (SWPPP-CA)
SHORT FORM PROJECT

PROJECT TITLE: WAG 3 OU 3-13 Group 5 Snake River Plain Aquifer

Facility or Location: INEEL   Environmental Checklist No.: INEL-00-022 Rev. 1

Project Description:

The proposed Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) action will conduct drilling and sampling operations in and around the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Engineering and Environmental Laboratory (INEEL). The purpose of this project is to guide the collection and analysis of groundwater information to evaluate the model-predicted hot spot above, below, and within the "HI" interbed to check the WAG-3 RI/FS model accuracy and update the model predictions for contaminant of concern (COC) concentrations in 2095 and beyond. "HI" is the nomenclature for the interbed located between the H and I basalt flow beds. The project will also collect data from wells over a 20-year period to evaluate the Snake River Plain Aquifer under and in the vicinity of the INTEC facility. Field sampling activities will be conducted in accordance with the agency (DOE, EPA, and State of Idaho) approved CERCLA document "Monitoring System and Installation Plan for Operable Unit 3-13, Group 5, Snake River Plain Aquifer (SRPA)" (DOE/ID-10782).

Specific activities that potentially involve disturbing soil include:

- Installing up to five new wells in the vicinity of the model-predicted hot spot south of INTEC to evaluate the existence and magnitude of the predicted hot spot. The wells will be located as shown on the attached map.
- Placement of a temporary decontamination pad for field cleaning of well drilling and support equipment. The decontamination pad will be located in a gravel storage area as shown on the attached map.

Project Construction Date/Duration: July 2002/Finish well drilling activities September 30, 2002

Area of Site to be disturbed: About 1/3 acre per installation (up to 5 wells/boreholes) will be mowed, about 2 acres total

Standard requirements:

☒ Spill prevention measures and prompt cleanup of any liquid or dry material spills.

☒ Minimize offsite tracking of sediments from vehicles.

☒ Minimize area of disturbance and preserve vegetation.

☒ Good Housekeeping procedures, including:

- ☒ Proper and orderly storage of chemicals, pesticides, fertilizers, fuel, and other hazardous materials.
- ☒ Proper and regular disposal of sanitary, construction, and hazardous wastes.

☒ Fugitive dust control measures.

☒ Perform inspection prior to project close-out.

☒ Attach a site map which indicates drainage patterns, discharge locations, potential pollution sources (equipment and material storage areas including soil piles), areas of soil disturbance, and stabilization practices.

Final Stabilization: (Identify soil stabilization measures and describe scheduling. Identify the entities responsible for implementation and maintenance.)

Mowed areas will be evaluated for reseeding but should not require it because roots are likely to survive. Reseeding will be performed if recommended by a Plant Ecologist.

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Allowable Non-Storm Water Discharge: (Identify type of discharge and describe pollution prevention measures.)

There will be some development water, some water from decontamination activities, and limited amounts of purge water. All water will be containerized and managed according to the project Waste Management Plan.

I have evaluated and identified controls adequate to meet the requirements of the INEEL Storm Water Pollution Prevention Plan for Construction Activities.

Project Manager

Signature: [signature] Date: 5/1/02

Name (Please Print): Howard Forsythe Phone Number: 6-1603

I am in agreement with the provisions set forth in this plan.

INEEL SWPPP Coordinator:

Signature: DL Braun Date: 4-30-02

Worksheet must be appended to the Generic Plan or Facility SWPPP-CA.